Ambient Air Quality Monitoring
Opportunity and Warm Springs Sites
Third Quarter of 2008

Prepared for

Anaconda Deer Lodge County

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1.0 INTRODUCTION

This quarterly report documents the ambient air quality monitoring program conducted by Kuipers & Associates on behalf of Anaconda Deer Lodge County at Opportunity and Warm Springs locations adjacent to the Atlantic Richfield Lower Waste Management Area. The months of July through September 2008 are included in this quarterly report, with a more detailed data summary in the monthly reports.

Objectives of this quarterly report are listed below.

- Summarize the PM10 and Total Suspended Particulate (TSP) data on a quarterly basis and compare to applicable standards.
- Compare daily average TSP values recorded by the Opportunity Site against the PM10 values reported by the Atlantic Richfield Company's South Site.
- Present summarized meteorological data for the quarter.
- Present the Data Quality Summary (PM10, TSP and meteorological).
    - Review the hourly data according to the Environmental Protection Agency's Air Quality System Null Data Qualifier Codes.
    - Format hourly PM10 and TSP data for each month to fit the Environmental Protection Agency's Air Quality System raw data template.

Figure 1 shows the ADLC monitoring locations in Opportunity and Warm Springs, and the Atlantic Richfield Company’s South Site monitoring location.


ADLC Warm Springs PM10
ARCO North PM10
ADLC Opportunity TSP
ARCO South PM10
Feet
0 625 1,250 2,500 3,750 5,000
N
Water & Environmental Technologies
Anaconda Deer Lodge County
Air Quality Monitoring points
Figure 1

2.0 PM10 AND TSP DATA SUMMARY

The Met One E-BAM portable PM10 monitor at Warm Springs and the TSP monitor at Opportunity collected continuous hourly data at both locations from July 1 through September 30.

During the period of operation, data recovery was 97.6% at Opportunity and 99.5% at Warm Springs. Detailed ambient air quality monitoring results for the third quarter of 2008 are summarized in the July, August, and September monthly reports prepared by Kuipers & Associates. A general discussion of ambient air quality monitoring data from the third quarter of 2008 is provided in the following sections. All PM10 and TSP data are reported at Local temperature and pressure (LTP) conditions.

2.1 Opportunity Site

Continuous monitoring at the Opportunity site was changed from PM10 to TSP on July 1, to 1) address local citizens' concern about total (as opposed to inhalable) airborne particulate, and 2) provide a greater particulate mass on the sampler's filter tape for possible future trace element analyses. This was accomplished by replacing the sampler's PM10 intake with a TSP intake; no other changes were made. At the Opportunity location daily average TSP concentrations ranged from 5 to 76 $\mu g/m^3$ with an average of 25 $\mu g/m^3$ throughout the third quarter. The maximum daily average TSP reading of 76 $\mu g/m^3$ was observed on August 19, when haze and smoke from regional forest fires was observed. Haze and smoke was noted on many days between mid-July and late August, but was generally less severe than in 2007. There is considerable hourly variability on many days; on average the maximum daily one-hour concentration was 86 $\mu g/m^3$ in July, 93 $\mu g/m^3$ in August and 68 $\mu g/m^3$ in September. Daily average TSP concentrations for the quarter are presented in Figure 2 for the Opportunity monitoring site.

Currently, there is no ambient air quality standard for TSP. However, all daily average TSP results for the third quarter of 2008 at Opportunity were below the historical 24-hour Montana Ambient Air Quality Standard of 200 $\mu g/m^3$.

No Opportunity TSP data from the third quarter was rejected or omitted for quality assurance or quality control check results. Minor data losses occurred due to maintenance activities and power outages. Also, on August 11-12 twenty-four hours of TSP data were lost because the sampler was removed from the field to troubleshoot and correct the Airsis satellite data transmission system.

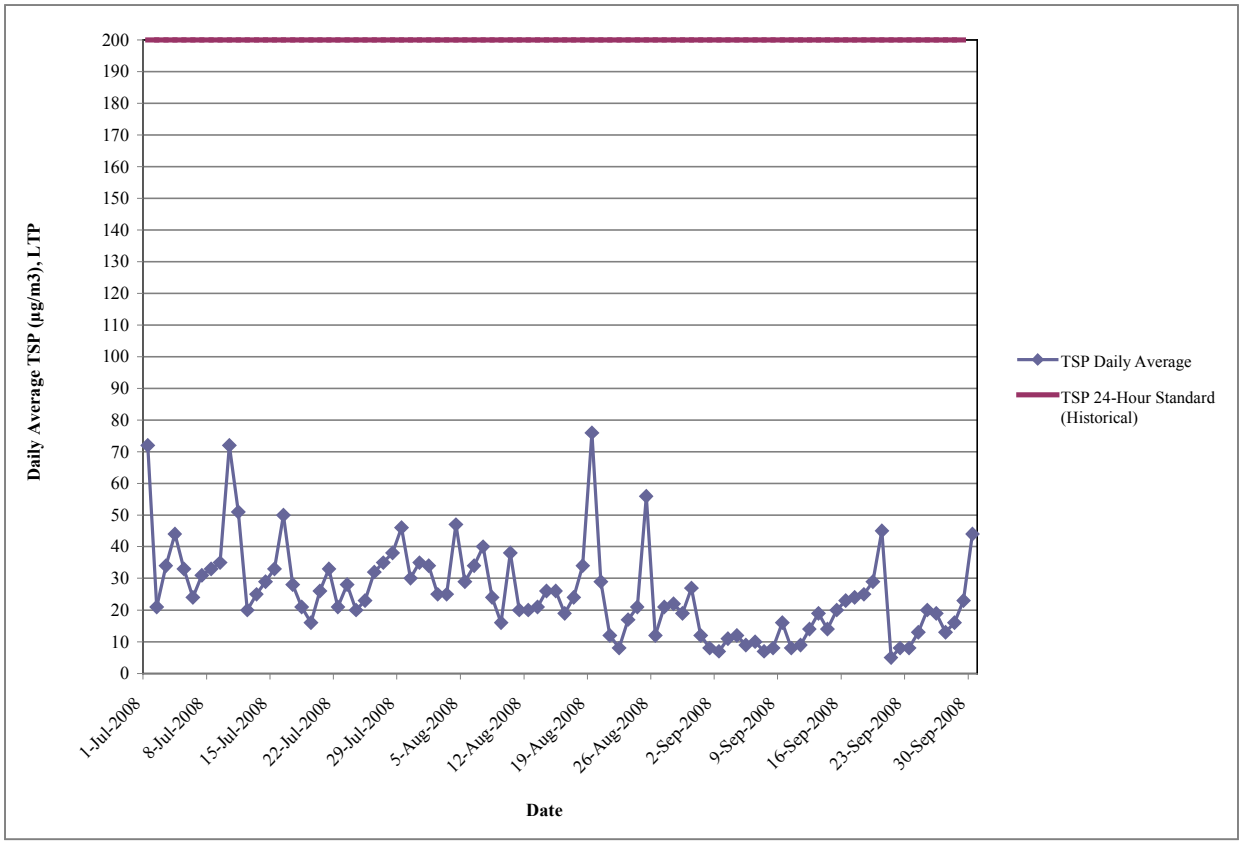

FIGURE 2 – OPPORTUNITY SITE DAILY AVERAGE TSP CONCENTRATION

2.2 Warm Springs Site

At the Warm Springs location daily average PM10 concentrations ranged from 1 to 36 µg/m^3 with a quarterly average of 10 µg/m^3. The maximum daily average PM10 reading of 36 µg/m^3 was observed on August 19 – the same date on which the maximum daily average TSP reading was observed at Opportunity. There is considerable hourly variability on many days; on average the maximum daily one-hour concentration was 40 µg/m^3 in July, 24 µg/m^3 in August and 29 µg/m^3 in September. Daily PM10 average concentrations for the third quarter are presented in Figure 3 for the Warm Springs monitoring site.

All daily average PM10 results for the third quarter of 2008 at Warm Springs were well below the 24-hour Montana Ambient Air Quality Standard of 150 µg/m^3. No Warm Springs PM10 data from the third quarter was rejected or omitted for quality assurance or quality control reasons.

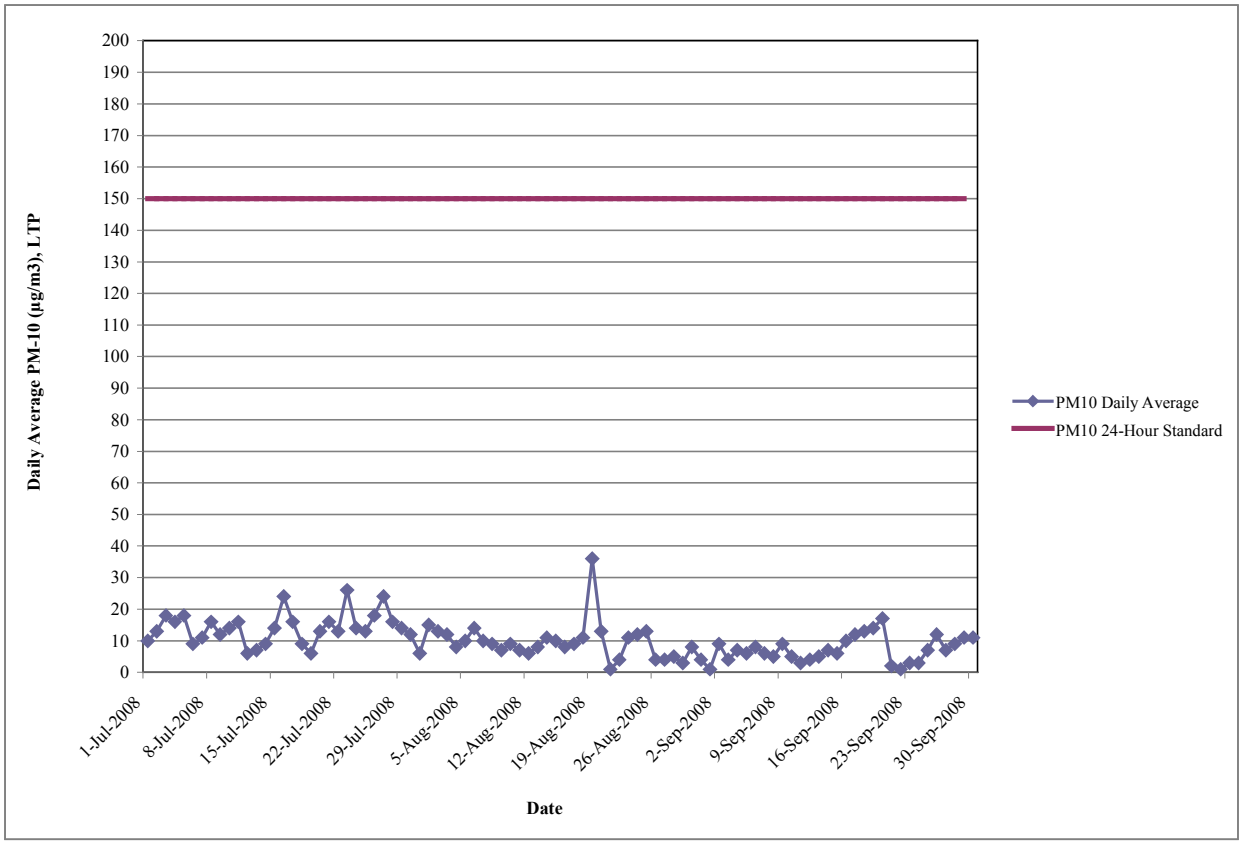

FIGURE 3 - WARM SPRINGS SITE DAILY AVERAGE PM10 CONCENTRATION

3.0 COLLOCATED PARTICULATE MONITORING RESULTS COMPARISON

Daily average (24-hour) results from the ADLC E-BAM TSP monitor at the Opportunity site were compared to the Atlantic Richfield Wedding PM10 monitors at the South Site for the quarter. The ADLC monitor collects screening level data, while the Atlantic Richfield monitors follow a federal reference method (FRM) required for compliance with air quality standards. While these are different measurements, collocated PM10 data collected at Opportunity from May 2007 through June 2008 indicated good general agreement between the E-BAM and Wedding PM10 monitoring systems. Therefore, a comparison of the E-BAM TSP data versus Wedding PM10 data should provide an indication of the ratio of total airborne particulate to the inhalable fraction (PM10).

The individual collocated results are listed in Table 1, and depicted graphically in Figure 4. While the ratio shows high day-to-day variability –particularly at lower concentrations – on average the total amount of airborne particulate (TSP) is roughly three times the amount of inhalable particulate (PM10). This relationship is fairly consistent whether one calculates the average of the daily TSP/PM10 ratios (3.06), or a total mass ratio (2.79). The diagonal line on Figure 4 represents a best-fit linear regression of TSP against daily average PM10 values.

TABLE 1 – COLLOCATED RESULTS FOR TSP VS. PM10
DAILY AVERAGE VALUES
THIRD QUARTER 2008

(All values are $\mu g/m^3$ at Local temperature and pressure (LTP))

Date	Standard ARCO - PM-10 Wedding FRM South Site	Test ADLC - TSP Met One E-BAM Opportunity Site	TSP as Percent of PM-10	TSP as Percent of PM-10 Cumulative
July 2, 2008	10	21	210	210
July 5, 2008	15	33	220	216
July 8, 2008	13	33	254	229
July 11, 2008	14	51	364	265
July 14, 2008	11	29	264	265
July 17, 2008	14	28	200	253
July 20, 2008	12	26	217	248
July 23, 2008	13	28	215	244
July 26, 2008	15	32	213	240
July 29, 2008	13	46	354	252
August 1, 2008	15	34	227	249
August 4, 2008	8	47	588	267
August 7, 2008	11	40	364	273
August 10, 2008	10	38	380	279
August 13, 2008	9	21	233	277
August 16, 2008	10	19	190	273
August 19, 2008	31	76	245	269
August 22, 2008	1	8	800	271
August 25, 2008	12	56	467	281
August 28, 2008	4	22	550	285
August 31, 2008	3	12	400	287
September 3, 2008	4	11	275	287
September 6, 2008	4	10	250	286
September 9, 2008	8	16	200	283
September 12, 2008	5	14	280	283
September 15, 2008	7	20	286	283
September 18, 2008	13	25	192	279
September 21, 2008	2	5	250	279
September 24, 2008	5	13	260	279
September 27, 2008	8	13	163	276
September 30, 2008	12	44	367	**279**

Mean	306
Maximum	800
Minimum	163

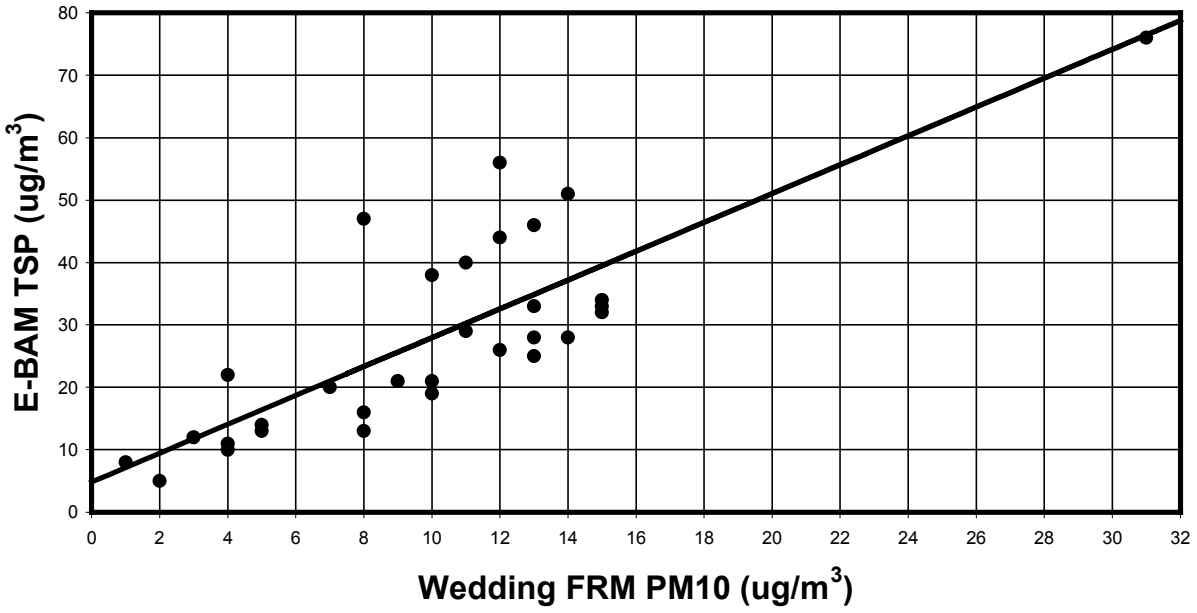

FIGURE 4 – COLLOCATED RESULTS COMPARISON FOR ADLC OPPORTUNITY E-BAM (TSP) AND ATLANTIC RICHFIELD WEDDING FRM (PM10)

4.0 METEOROLOGICAL DATA SUMMARY

Meteorological data were collected continuously and recorded hourly at both the Opportunity and Warm Springs E-BAM monitoring sites. Parameters monitored include wind direction, wind speed, temperature and relative humidity. The data were collected at a height of approximately eight feet above ground level.

Summarized meteorological data for these sites are presented and discussed in Sections 4.1 and 4.2. Detailed daily meteorological summaries are presented in Attachment A; information presented includes:

- Average, maximum and minimum air (shade) temperature for each day,
- Average and maximum hourly average wind speed for each day,
- Resultant wind direction for each day (weighted by wind speed – this is the mean direction from which the wind was blowing), and
- Average daily relative humidity.

Additionally, the summaries in Attachment 1 show the average daily and maximum daily PM10 and TSP concentrations, to facilitate correlation with the meteorological data.

Section 4.3 presents wind rose summaries for periods with elevated PM10 and TSP concentrations.

4.1 Opportunity Site

Figure 5 summarizes the meteorological data for the Opportunity site. Winds were generally light, averaging 1.9 m/s (4.3 mph). The highest recorded hourly wind speed was 7.2 m/s (16.1 mph); it is likely that higher short-term gusts have occurred, but the system only monitors hourly average wind speed. Temperatures were near normal in all three months. Monthly averages were 17.9°C (64.2°F) in July, 16.5°C (61.7°F) in August and 10.1°C (50.1°F) in September. Temperature extremes ranged from a low of –1.9°C (28.6°F) in September to a high of 33.8°C (92.8°F) in August. The average humidity for the quarter was 51%, with considerable daily variation.

Winds at the Opportunity site were mostly from the southwest quadrant, though north-northeasterly winds also were common. The strongest winds tended to be from westerly and north-northeasterly directions.

Minor meteorological data losses occurred due to routine maintenance and short power outages. Additionally, 24 hours of data were lost on August 11-12 when the sampler was removed for troubleshooting of the satellite data transmission system.

Part 1 – Means and Extremes

Parameter	July	August	September	Quarter
Average Wind Speed, m/s	1.9	2.0	1.7	1.9
Maximum (hourly) Wind Speed, m/s	5.8	6.6	7.2	7.2
Average Temperature, °C	17.9	16.5	10.1	14.9
Maximum Temperature, °C	33.3	33.8	27.4	33.8
Minimum Temperature, °C	1.8	1.7	-1.9	-1.9
Average Relative Humidity, %	46	50	56	51
Refer to Attachment A for detailed daily meteorological summaries.				

Part 2 – Quarter 3, 2008 Wind Rose

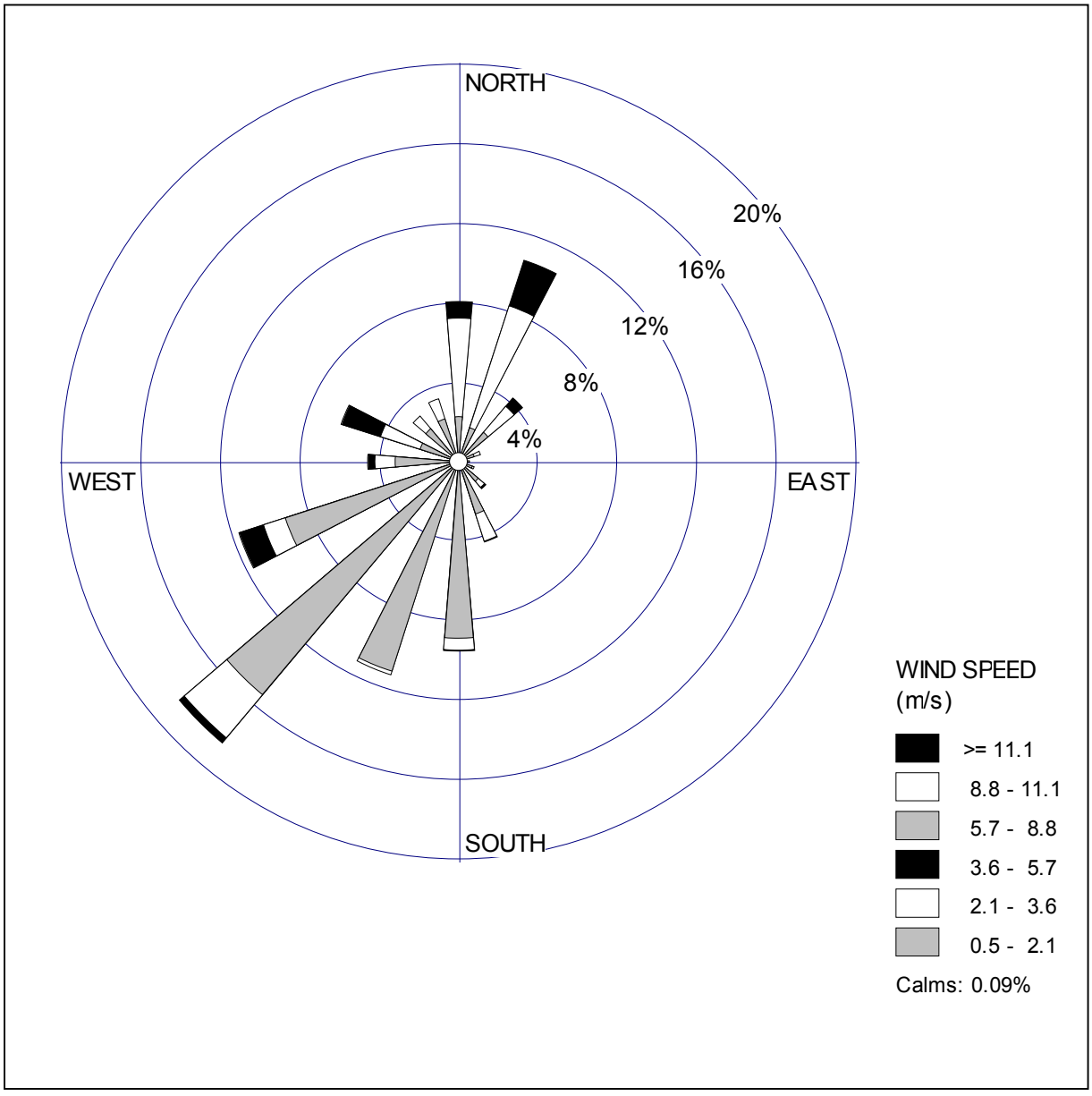

FIGURE 5 – METEOROLOGICAL SUMMARY FOR OPPORTUNITY SITE

4.2 Warm Springs Site

Figure 6 summarizes the meteorological data for the Warm Springs site. Winds were generally light, averaging 1.6 m/s (3.6 mph). The highest recorded hourly wind speed was 6.5 m/s (14.5 mph); it is likely that higher short-term gusts have occurred, but the system only monitors hourly average wind speed. Temperatures were near normal in all three months. Monthly averages were 18.4°C (65.0°F) in July, 16.9°C (62.4°F) in August and 10.3°C (50.6°F) in September. Temperature extremes ranged from a low of –2.4°C (27.7°F) in September to a high of 33.5°C (92.3°F) in both July and August. The average humidity for the quarter was 53%, with considerable daily variation.

Winds at the Warm Springs site were mostly from northerly and southerly directions. The strongest winds were from the south-southwest and west.

Minor meteorological data losses occurred due to routine maintenance and short power outages.

Part 1 – Means and Extremes

Parameter	July	August	September	Quarter
Average Wind Speed, m/s	1.7	1.7	1.5	1.6
Maximum (hourly) Wind Speed, m/s	6.1	6.5	5.7	6.5
Average Temperature, °C	18.4	16.9	10.3	15.2
Maximum Temperature, °C	33.5	33.5	28.2	33.5
Minimum Temperature, °C	1.7	1.9	-2.4	-2.4
Average Relative Humidity, %	49	52	59	53
Refer to Attachment A for detailed daily meteorological summaries.				

Part 2 – Quarter 3, 2008 Wind Rose

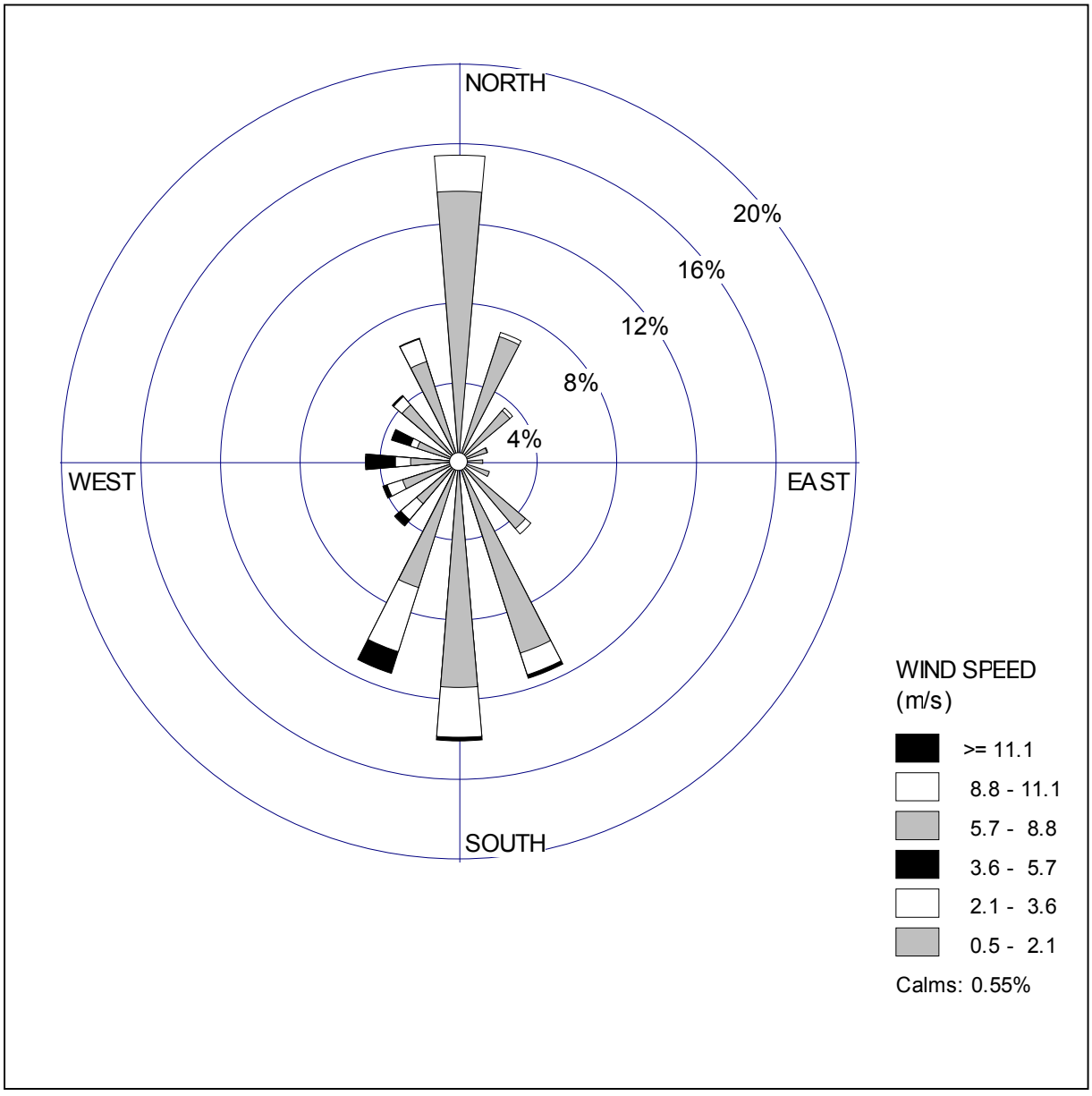

FIGURE 6 – METEOROLOGICAL SUMMARY FOR WARM SPRINGS SITE

4.3 Meteorological Conditions and Particulate Concentrations

Additional wind roses were generated for both monitoring sites to depict wind patterns during periods of elevated particulate concentrations; they are shown in Figure 7 (Opportunity) and Figure 8 (Warm Springs). For this analysis, "elevated" was defined as TSP concentrations of 60 $\mu g/m^3$ or greater at Opportunity, and PM10 concentrations of 26 $\mu g/m^3$ or greater at Warm Springs. These thresholds – corresponding to approximately the 95^{th} percentile at both sites– were used to ensure that a sufficient volume of data was incorporated to produce meaningful wind rose results.

When comparing the wind roses for the Opportunity site (Figures 5 and 7), it is evident that wind speeds were higher during elevated TSP conditions. This is reasonable, since the larger – and therefore heavier – particulates collected by a TSP monitor would require greater wind activity to be entrained into the air. The wind direction distribution during elevated TSP periods was similar to the overall pattern, although north-northeast winds were somewhat more pronounced than at other times. This indicates that elevated TSP periods are related mostly to higher wind speeds, and not particular wind directions.

The corresponding wind roses for the Warm Springs site (Figures 6 and 8) show somewhat higher wind speeds during elevated PM10 periods, but the difference is much less pronounced than at Opportunity. Also, while light northerly winds were quite common overall, they were less likely to be associated with elevated PM10 levels.

In combination, these results indicate that high wind speeds are strongly associated with elevated TSP concentrations, while elevated PM10 levels often occur during calmer conditions.

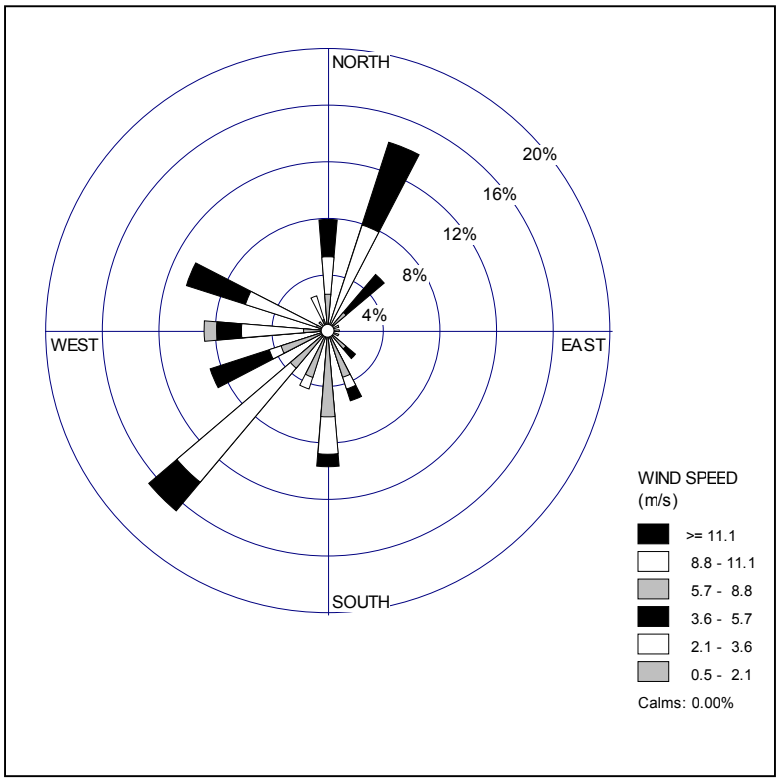

FIGURE 7 – OPPORTUNITY WIND ROSE FOR ELEVATED PM10 PERIODS

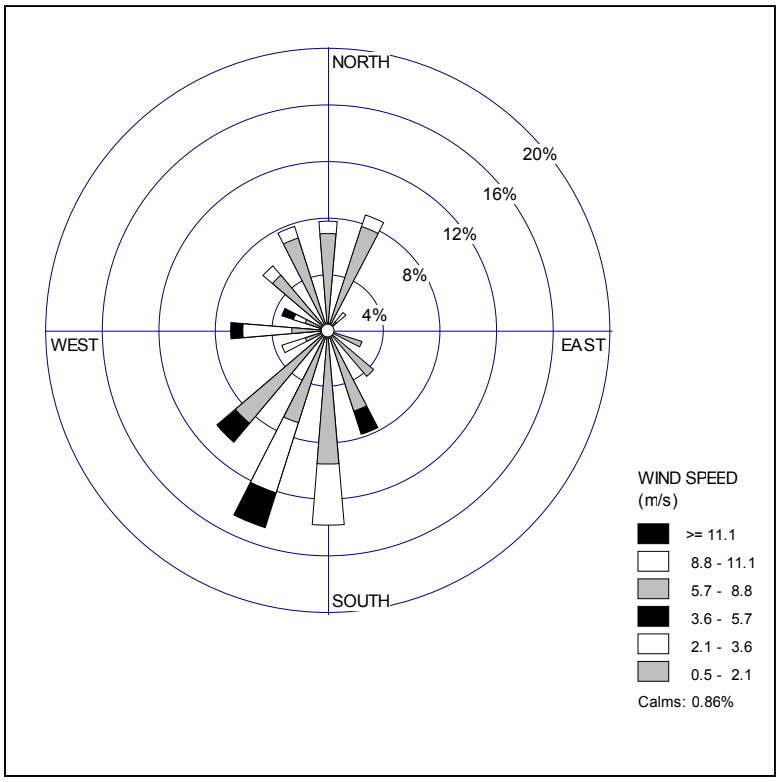

FIGURE 8 – WARM SPRINGS WIND ROSE FOR ELEVATED PM10 PERIODS

5.0 DATA QUALITY SUMMARY

Data quality is an integral part of any ambient monitoring program. The data collected must be of a known quality to be used for evaluation of local air quality and meteorological characteristics. This is particularly important when an objective of a monitoring program is to identify possible emission sources, and meteorological events associated with certain ambient air quality conditions – in this case, elevated PM10 or TSP levels.

The Opportunity and Warm Springs monitoring systems were checked and/or calibrated (as appropriate for each monitoring parameter) monthly during the third quarter of 2008. This was accomplished via performance checks using standards that were either:

- Traceable to NIST; or
- Otherwise certified by the test equipment manufacturer.

Each instrument response was recorded, and evaluated to determine whether it fell within its respective acceptance range. In the event that a response fell outside (or near the limits of) the applicable acceptance range, the monitor or sensor in question was adjusted or recalibrated as appropriate. Such results then must be evaluated, in conjunction with a detailed data review, to identify data periods that must be flagged or invalidated.

Minor sampler maintenance was also performed on a monthly basis. Additionally, data were reviewed frequently via satellite link, and inspected for any suspicious behavior requiring investigation.

5.1 Summary of Performance Check / Maintenance Activities

Performance checks and minor maintenance were conducted on a monthly basis. Table 2 summarizes checks and maintenance for the E-BAM sampler itself, while Table 3 lists the meteorological checks. Information presented includes:

- The instrument model and serial number for each component of the monitoring system;
- Each type of check/maintenance performed on that component;
- Performance acceptance ranges; and
- A description of the calibration standard (and its traceability) used to perform each check.

5.2 Data Quality Issues

In general, performance checks and maintenance activities conducted throughout the third quarter of 2008 indicted that the E-BAM samplers were meeting performance objectives. The performance check procedures, routine maintenance activities and results are discussed in detail in Attachment B. All PM10 / TSP monitor test results obtained during the third quarter of 2008 were satisfactory. However, a significant adjustment was made to the calibration of the temperature sensor at Warm Springs on August 21.

Minor data losses occurred at both monitoring sites during the third quarter of 2008, including the following:

- On August 11-12 at Opportunity, 24 hours of data were lost because the sampler was taken offsite to investigate a problem with the satellite data transmission function.
- On July 26, September 28 and September 29 at Warm Springs, a total of five hours of relative humidity data were invalidated because of erroneous readings that may have been caused by a loose cable connection.
- At Opportunity, a total of 10 hours of monitoring data were lost due to power outages.
- At Warm Springs, a total of 2 hours of monitoring data were lost due to power outages.
- Additional minor data losses occurred at both sites due to routine maintenance.

No unexplainably high PM10 readings occurred at either site during the third quarter of 2008.

TABLE 2 – SUMMARY OF PERFORMANCE CHECKS E-BAM SAMPLER

Met One E-BAM PM_{10} and TSP Samplers

Instrument	Model	Serial No.		Check Description			
		OPP	*WS*	*Check Description*	*Acceptance Range*	*Check/Cal. Standard*	*Traceability*
Particulate Sampler	E-BAM	F7290 (TSP)	F7289 (PM_{10})	Leak Check	<1.5 LPM	BX-302 valve	N/A
				Operating Flow	+/- 2% (+/- 0.33 LPM)	Delta Cal S/N 000498	MFR/NIST
				Pump Test	(1)	BX-302 valve	N/A
				Zero/Span	Pass / Fail	Membrane Plates	MFR
				Clean Vane & Nozzle	(2)	N/A	N/A
				Clean PM10 Head	N/A	N/A	N/A
Barometer (3)	E-BAM	F7290	F7289	Collocated	+/- 2 mmHg	Aneroid Barometer	Mercury Barometer

Explanatory Notes for Table 2

N/A = Not applicable
MFR/NIST = Certified traceable to NIST by the manufacturer
MFR = Certified accurate per Met One's E-BAM-6100 Final Test Procedure
(1) Acceptance range varies with test flow rate, see Attachment B for discussion.
(2) Leak check performed following cleaning, result must be <1.5 LPM.
(3) Barometer is internal to E-BAM sampler.

TABLE 3 – SUMMARY OF PERFORMANCE CHECKS METEOROLOGICAL INSTRUMENTS

Met One Meteorological Instruments

Instrument (1)	Model	Serial No.		Check Description			
		OPP	*WS*	*Check Description*	*Acceptance Range*	*Check/Cal. Standard*	*Traceability*
Temperature	9250	F9487	F9481	Collocated	+/- 0.5 °C	Assmann Psychrometer	NIST
Relative Humidity	593	F9346	F9349	Collocated	+/- 5% Relative Humidity	Assmann Psychrometer	NIST
Wind Speed	0348	G2181	G2187	Collocated	+/- 0.5 m/s	Met One 010 Sensor	NIST
				Rotation Check	+/- 0.2 m/s	Synchronous Motor	MFR
Wind Direction	0348	G2181	G2187	Initial Alignment	+/- 2 degrees	Solar Sighting	NIST Time
				Linearity	+/- 3 degrees	Visual Crossarm Alignment (2)	N/A

Explanatory Notes for Table 3

(1) All meteorological instruments include certificate of NIST traceability from Met One, valid for a period of one year.
(2) Linearity checked by visually aligning wind vane in 90-degree increments with respect to crossarm.

MFR = Motor rotation rate provided by manufacturer.

6.0 AIR QUALITY SYSTEM NULL DATA QUALIFIER CODES

Invalid hours for the quarter are summarized in Table 4 for the Opportunity site, and Table 5 for the Warm Springs site. The complete PM10 and TSP data sets for the quarter, and current qualifier codes are presented in Attachment C.

TABLE 4 – OPPORTUNITY SITE INVALID DATA PERIODS QUARTER 3, 2008

Part A – TSP

Date	Invalid Hours (ending at) MST	Invalid Hours GMT	Reason	Data Invalidation Code
7-1-2008	1200	1900	Tape change + change to TSP head	BA
7-18-2008	1500-1900	2200-2300	Power outage	AV
7-19-2008		0000-0200	Power outage	AV
7-25-2008	1400	2100	Monthly checks	BA
8-1-2008	1300	2000	Tape change	BA
8-7-2008	1300	2000	Straighten port pins	BA
8-11-2008	1600-2300	2300	Troubleshooting	BA
8-12-2008	0000-1500	0000-2200	Troubleshooting	BA
8-25-2008	1300-1400	2000-2100	Monthly checks / pump change	BA
9-1-2008	0700-1100	1400-1800	Power outage	AV
9-1-2008	1600	2300	Tape change	BA
9-23-2008	1600	2300	Monthly checks	BA

Part B – Wind Direction / Wind Speed

Date	Invalid Hours (ending at) MST	Invalid Hours GMT	Reason	Data Invalidation Code
7-18-2008	1500-1900	2200-2300	Power outage	AV
7-19-2008		0000-0200	Power outage	AV
7-25-2008	1400	2100	Monthly checks	BA
8-3-2008	1000	1700	Data not recorded	AN
8-7-2008	1300	2000	Straighten port pins	BA
8-11-2008	1600-2300	2300	Troubleshooting	BA
8-12-2008	0000-1500	0000-2200	Troubleshooting	BA
8-25-2008	1300-1400	2000-2100	Monthly checks / pump change	BA
9-1-2008	0700-1100	1400-1800	Power outage	AV
9-23-2008	1600	2300	Monthly checks	BA

Part C – Temperature / Relative Humidity

Date	Invalid Hours (ending at) MST	Invalid Hours GMT	Reason	Data Invalidation Code
7-18-2008	1500-1900	2200-2300	Power outage	AV
7-19-2008		0000-0200	Power outage	AV
8-7-2008	1300	2000	Straighten port pins	BA
8-11-2008	1600-2300	2300	Troubleshooting	BA
8-12-2008	0000-1500	0000-2200	Troubleshooting	BA
8-25-2008	1300-1400	2000-2100	Monthly checks / pump change	BA
9-1-2008	0700-1100	1400-1800	Power outage	AV

TABLE 5 – WARM SPRINGS SITE INVALID DATA PERIODS QUARTER 3, 2008

Part A – PM10

Date	Invalid Hours (ending at) MST	Invalid Hours GMT	Reason	Data Invalidation Code
7-1-2008	1100	1800	Tape change	BA
7-19-2008	1900-2000		Pump change	BA
7-20-2008		0200-0300	Pump change	BA
7-25-2008	1200	1900	Monthly checks	BA
8-1-2008	1200	1900	Tape change	BA
8-7-2008	1300-1400	2000-2100	Power outage	AV
8-25-2008	1200	1900	Monthly checks	BA
9-1-2008	1500	2200	Tape change	BA
9-23-2008	1400-1500	2100-2200	Monthly checks	BA

Part B – Wind Direction / Wind Speed

Date	Invalid Hours (ending at) MST	Invalid Hours GMT	Reason	Data Invalidation Code
7-19-2008	1900-2000		Pump change	BA
7-20-2008		0200-0300	Pump change	BA
7-25-2008	1200	1900	Monthly checks	BA
8-7-2008	1300-1400	2000-2100	Power outage	AV
8-25-2008	1100	1800	Monthly checks	BA
9-23-2008	1400	2100	Monthly checks	BA

Part C – Temperature / Relative Humidity

Date	Invalid Hours (ending at) MST	Invalid Hours GMT	Reason	Data Invalidation Code
7-19-2008	1900-2000		Pump change	BA
7-20-2008		0200-0300	Pump change	BA
7-25-2008	1200	1900	Monthly checks	BA
7-26-2008	2100		Bad connection (1)	AN
7-27-2008		0400	Bad connection (1)	AN
8-7-2008	1300-1400	2000-2100	Power outage	AV
9-28-2008	1400-1600	2100-2300	Bad connection (1)	AN
9-29-2008	1500	2200	Bad connection (1)	AN
(1) Relative humidity only				

7.0 REFERENCES

EPA. August 1998. EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II, Part 1, Ambient Air Quality Monitoring Program Quality System Development. EPA-45a/R-98-004.

ATTACHMENT A

METEROLOGICAL SUMMARY SHEETS
THIRD QUARTER 2008

OPPORTUNITY DAILY DATA SUMMARY - JULY 2008

(Midnight to Midnight, Mountain Standard Time)

Day	(a) Average Concentration (ug/m3)	(a) Maximum Concentration (ug/m3)	Average Wind Speed (m/s)	Maximum Wind Speed (m/s)	Resultant Wind Direction (degrees) (b)	Average Temperature (deg C)	Maximum Temperature (deg C)	Minnimum Temperature (deg C)	Average Relative Humidity (percent)
1	72	251	1.8	5.8	279	18.3	26.5	11.1	55
2	21	104	1.8	3.5	5	16.4	24.0	7.9	67
3	34	88	1.7	3.6	41	19.6	29.7	8.1	59
4	44	116	2.1	4.3	174	21.5	33.3	12.8	55
5	33	86	1.4	3.9	17	15.6	22.9	8.5	71
6	24	59	1.9	3.8	29	17.2	24.7	6.8	54
7	31	95	1.9	3.8	357	17.0	26.3	5.5	47
8	33	49	2.2	3.9	321	17.7	25.9	6.3	43
9	35	64	1.6	2.9	227	19.0	29.3	7.1	41
10	72	231	2.9	4.8	265	20.4	28.8	9.1	33
11	51	191	2.8	4.4	357	14.4	20.7	3.5	26
12	20	46	1.6	2.7	5	14.2	25.3	1.8	40
13	25	88	2.0	3.8	298	18.2	27.8	5.7	34
14	29	57	2.3	4.3	265	19.3	27.7	8.7	30
15	33	98	2.6	5.3	21	17.4	25.2	8.2	42
16	50	106	1.4	4.2	220	16.8	24.7	7.8	50
17	28	42	1.5	3.2	302	17.4	25.6	8.0	46
18	21	39	1.5	2.7	240	14.5	24.7	7.6	53
19	16	27	1.7	3.3	26	16.0	26.4	4.3	41
20	26	59	1.6	3.8	242	17.1	31.2	4.2	44
21	33	59	1.8	3.5	21	21.7	33.1	7.9	39
22	21	67	1.8	4.3	241	16.5	21.6	12.4	70
23	28	72	2.0	4.5	247	18.5	27.4	7.1	53
24	20	37	2.1	3.9	3	16.5	24.7	8.0	51
25	23	45	1.7	4.0	22	18.5	30.8	5.0	51
26	32	57	2.2	4.7	261	21.5	32.5	9.6	41
27	35	58	1.8	3.8	277	19.8	29.8	8.7	43
28	38	80	2.0	4.9	23	18.0	27.8	6.9	46
29	46	112	2.5	5.7	233	19.8	29.5	6.8	36
30	30	51	2.6	4.8	315	18.7	24.6	11.8	36
31	35	142	1.8	4.0	220	17.4	28.9	3.4	38

(a) Values are at Local temperature and pressure (LTP). Values for July 1 include only TSP readings.
(b) Calculations are weighted with corresponding wind speeds

OPPORTUNITY DAILY DATA SUMMARY - AUGUST 2008

(Midnight to Midnight, Mountain Standard Time)

Day	(a) Average Concentration (ug/m3)	(a) Maximum Concentration (ug/m3)	Average Wind Speed (m/s)	Maximum Wind Speed (m/s)	Resultant Wind Direction (degrees) (b)	Average Temperature (deg C)	Maximum Temperature (deg C)	Minnimum Temperature (deg C)	Average Relative Humidity (percent)
1	34	93	2.3	4.3	352	20.2	31.3	9.0	36
2	25	69	1.9	3.9	344	15.6	26.3	7.1	58
3	25	108	1.7	3.4	2	14.3	23.0	4.0	63
4	47	352	1.6	3.4	8	15.5	26.3	3.7	55
5	29	58	1.9	3.8	357	19.0	30.0	5.7	40
6	34	67	1.5	2.9	354	19.4	31.9	5.5	44
7	40	230	1.9	3.3	198	19.9	31.6	13.1	56
8	24	164	1.9	3.7	214	18.7	24.9	12.4	62
9	16	34	1.7	3.2	201	18.1	27.1	11.1	60
10	38	193	2.5	5.4	341	16.3	26.5	7.1	54
11	20	49	2.3	4.8	246	12.7	24.0	3.7	51
12	20	34	2.4	3.9	25	19.2	26.4	9.7	35
13	21	51	1.4	3.1	318	16.4	25.2	8.1	44
14	26	59	2.1	4.6	17	16.6	25.2	7.3	50
15	26	46	1.4	2.4	285	15.9	25.8	4.8	50
16	19	43	1.8	2.9	197	18.9	30.5	8.1	40
17	24	51	1.3	2.1	205	20.0	32.4	7.4	37
18	34	62	2.0	4.3	166	22.1	33.8	7.3	32
19	76	204	1.9	4.6	297	19.9	28.9	12.1	47
20	29	48	2.6	5.2	246	15.9	24.9	7.6	61
21	12	57	2.9	6.6	327	10.5	14.2	6.7	75
22	8	28	1.8	3.1	280	11.9	21.1	4.1	54
23	17	34	1.7	3.6	349	15.3	27.6	1.7	49
24	21	45	1.7	2.9	205	19.4	33.0	5.8	39
25	56	309	2.9	5.6	18	19.6	29.3	12.0	40
26	12	66	3.1	4.9	308	11.3	16.6	3.7	50
27	21	91	2.6	5.1	300	11.3	14.7	4.9	49
28	22	57	2.4	4.0	268	14.4	22.7	4.1	53
29	19	41	1.8	3.0	231	16.9	28.9	6.3	47
30	27	86	2.6	4.9	13	16.8	24.6	7.1	45
31	12	41	2.5	4.2	349	8.9	12.7	3.2	80

(a) Values are at Local temperature and pressure (LTP)
(b) Calculations are weighted with corresponding wind speeds

OPPORTUNITY DAILY DATA SUMMARY - SEPTEMBER 2008

(Midnight to Midnight, Mountain Standard Time)

Day	(a) Average Concentration (ug/m3)	(a) Maximum Concentration (ug/m3)	Average Wind Speed (m/s)	Maximum Wind Speed (m/s)	Resultant Wind Direction (degrees) (b)	Average Temperature (deg C)	Maximum Temperature (deg C)	Minnimum Temperature (deg C)	Average Relative Humidity (percent)
1	8	20	1.3	2.7	344	3.5	6.6	-0.5	84
2	7	16	1.4	2.3	207	7.6	15.6	1.2	61
3	11	29	2.0	4.1	258	10.8	17.8	3.6	50
4	12	58	1.4	3.4	113	6.8	12.4	3.2	71
5	9	40	1.6	2.6	236	8.0	14.2	2.5	68
6	10	20	1.4	2.6	2	9.6	15.2	4.7	72
7	7	19	1.6	3.1	8	8.4	13.5	2.7	71
8	8	19	1.5	3.0	186	8.6	19.9	-1.9	62
9	16	31	1.6	3.1	257	12.0	20.5	2.7	56
10	8	35	1.8	4.7	341	5.8	9.3	1.6	78
11	9	30	1.4	2.5	182	7.6	17.2	-0.8	65
12	14	63	1.9	3.4	140	11.9	21.8	3.3	55
13	19	92	1.7	3.6	338	7.9	15.2	2.2	66
14	14	48	1.7	2.9	335	10.6	21.1	1.9	59
15	20	43	1.8	4.0	282	13.7	25.9	3.7	50
16	23	76	1.8	3.9	354	14.4	25.8	6.1	44
17	24	39	1.7	3.7	342	13.0	25.0	2.3	45
18	25	44	1.4	2.6	234	13.5	26.8	1.6	43
19	29	71	1.6	2.9	236	15.6	27.4	7.0	39
20	45	543	2.4	7.2	211	12.6	20.8	4.6	56
21	5	15	2.3	3.9	253	9.7	13.3	7.1	63
22	8	37	2.2	5.2	260	7.4	14.0	1.8	61
23	8	18	2.3	5.2	248	6.1	14.1	0.9	52
24	13	38	1.9	3.7	200	11.2	22.3	2.4	39
25	20	35	1.9	4.6	237	11.7	22.0	3.2	43
26	19	38	1.4	2.4	237	9.2	21.8	-0.7	58
27	13	27	1.9	4.4	252	12.5	23.2	2.5	38
28	16	34	1.6	3.5	327	8.8	19.6	1.0	49
29	23	50	1.3	2.1	279	9.5	22.5	-1.6	47
30	44	409	1.7	3.0	228	12.9	25.7	2.5	42

(a) Values are at Local temperature and pressure (LTP)
(b) Calculations are weighted with corresponding wind speeds

WARM SPRINGS DAILY DATA SUMMARY - JULY 2008

(Midnight to Midnight, Mountain Standard Time)

Day	(a) Average Concentration (ug/m3)	(a) Maximum Concentration (ug/m3)	Average Wind Speed (m/s)	Maximum Wind Speed (m/s)	Resultant Wind Direction (degrees) (b)	Average Temperature (deg C)	Maximum Temperature (deg C)	Minnimum Temperature (deg C)	Average Relative Humidity (percent)
1	10	35	1.7	4.2	262	18.6	26.3	9.8	57
2	13	81	1.3	2.6	340	16.6	24.3	8.3	71
3	18	87	1.6	3.9	220	20.4	30.0	9.9	59
4	16	42	2.1	3.2	193	21.7	33.0	12.1	56
5	18	45	0.9	1.4	36	15.9	22.6	9.4	73
6	9	24	1.2	2.0	28	17.6	25.9	5.6	56
7	11	32	1.3	2.4	352	17.5	26.2	5.4	51
8	16	28	1.4	2.0	61	18.0	27.0	7.2	47
9	12	34	1.5	2.5	157	19.4	29.5	8.7	45
10	14	27	3.3	5.7	266	21.1	29.6	10.5	33
11	16	45	1.7	2.8	346	14.8	21.8	4.9	29
12	6	17	1.4	2.1	300	14.9	25.9	1.7	43
13	7	19	1.5	3.1	311	18.2	28.7	6.8	38
14	9	20	2.7	5.0	251	19.8	28.2	11.5	33
15	14	23	1.6	2.6	9	17.9	26.0	8.0	44
16	24	44	1.6	4.0	207	17.5	25.8	8.0	51
17	16	28	1.4	2.4	301	18.3	27.4	8.8	47
18	9	22	1.4	2.4	174	16.5	24.9	7.9	51
19	6	14	1.4	2.4	165	15.6	27.3	4.3	46
20	13	65	1.4	2.8	178	18.2	32.4	6.5	43
21	16	25	1.5	2.0	42	22.4	33.5	10.3	38
22	13	34	1.7	3.6	200	17.0	22.4	13.3	72
23	26	179	1.8	3.8	207	18.3	28.3	6.5	58
24	14	26	1.4	2.3	348	17.1	25.7	8.3	54
25	13	31	1.3	2.3	337	18.9	30.9	6.4	53
26	18	26	1.7	4.6	226	21.5	33.2	11.4	44
27	24	35	1.4	2.9	232	20.2	29.7	9.8	44
28	16	33	1.3	2.2	38	18.7	28.5	8.9	48
29	14	46	2.7	6.1	207	20.3	30.5	7.8	36
30	12	35	2.4	5.3	307	18.4	25.7	10.0	41
31	6	26	2.2	4.6	194	17.8	29.6	4.4	40

(a) Values are at Local temperature and pressure (LTP)
(b) Calculations are weighted with corresponding wind speeds

WARM SPRINGS DAILY DATA SUMMARY - AUGUST 2008

(Midnight to Midnight, Mountain Standard Time)

Day	(a) Average Concentration (ug/m3)	(a) Maximum Concentration (ug/m3)	Average Wind Speed (m/s)	Maximum Wind Speed (m/s)	Resultant Wind Direction (degrees) (b)	Average Temperature (deg C)	Maximum Temperature (deg C)	Minnimum Temperature (deg C)	Average Relative Humidity (percent)
1	15	29	1.5	3.5	356	20.2	31.8	7.4	40
2	13	26	1.3	2.4	346	15.5	27.5	6.4	64
3	12	38	1.4	2.2	12	15.6	24.9	6.4	62
4	8	23	1.2	1.9	7	16.2	27.1	5.6	56
5	10	21	1.4	2.1	18	19.8	30.8	8.4	41
6	14	38	1.3	2.6	297	20.1	32.0	7.2	44
7	10	18	1.9	4.4	189	19.8	32.4	13.2	59
8	9	21	1.8	3.9	220	19.5	26.3	12.9	63
9	7	18	1.8	3.8	212	18.4	28.4	9.0	63
10	9	27	1.5	3.0	11	16.7	25.9	8.1	59
11	7	15	2.4	5.1	264	15.0	24.9	2.9	45
12	6	24	1.2	1.9	41	15.7	27.3	1.9	47
13	8	23	1.1	2.1	133	16.9	25.8	8.9	47
14	11	18	1.4	2.4	13	17.2	26.7	7.6	51
15	10	20	1.5	2.8	293	16.8	26.6	5.8	51
16	8	17	1.6	3.1	204	19.5	31.0	8.4	44
17	9	17	1.4	2.1	230	21.1	32.8	9.4	34
18	11	29	2.1	3.4	167	23.4	33.5	10.8	29
19	36	65	1.5	3.0	311	19.8	28.5	11.9	53
20	13	37	2.6	5.0	222	16.2	25.7	8.4	64
21	1	12	2.1	6.5	284	11.1	15.1	7.0	77
22	4	14	1.6	2.7	198	12.7	21.9	3.5	56
23	11	23	1.2	1.9	48	15.5	28.0	3.5	53
24	12	30	1.8	3.0	181	19.8	33.0	7.4	40
25	13	35	1.8	2.7	30	20.3	29.7	10.9	42
26	4	16	2.7	5.6	282	11.4	17.6	3.0	55
27	4	15	2.5	5.3	230	11.6	17.2	4.5	52
28	5	16	2.7	5.5	251	14.8	22.8	5.8	56
29	3	25	1.9	3.9	192	17.3	29.8	7.7	50
30	8	17	1.6	2.7	8	17.4	25.9	9.5	48
31	4	23	2.0	4.0	351	9.3	13.8	3.7	82

(a) Values are at Local temperature and pressure (LTP)
(b) Calculations are weighted with corresponding wind speeds

WARM SPRINGS DAILY DATA SUMMARY - SEPTEMBER 2008

(Midnight to Midnight, Mountain Standard Time)

Day	(a) Average Concentration (ug/m3)	(a) Maximum Concentration (ug/m3)	Average Wind Speed (m/s)	Maximum Wind Speed (m/s)	Resultant Wind Direction (degrees) (b)	Average Temperature (deg C)	Maximum Temperature (deg C)	Minnimum Temperature (deg C)	Average Relative Humidity (percent)
1	1	25	1.0	2.1	325	3.5	7.9	-0.6	85
2	9	118	1.7	3.1	183	8.7	16.7	1.9	60
3	4	15	1.7	3.2	218	11.3	19.2	3.2	53
4	7	38	1.3	2.2	186	7.1	13.3	1.8	74
5	6	20	1.6	3.2	182	8.5	15.4	1.8	71
6	8	50	1.0	1.6	338	9.9	16.3	3.6	73
7	6	21	1.4	2.9	0	9.3	15.9	3.3	71
8	5	16	1.3	2.2	166	9.7	20.5	0.0	63
9	9	16	1.1	1.6	350	11.6	21.5	2.3	64
10	5	24	1.3	2.9	356	6.1	11.2	1.6	81
11	3	12	1.3	2.1	159	8.2	18.7	-1.0	68
12	4	16	1.3	2.1	112	12.0	23.1	2.3	61
13	5	25	1.4	2.8	0	8.2	16.5	3.2	70
14	7	20	1.3	2.1	80	11.0	22.4	1.9	62
15	6	19	1.3	2.3	104	13.9	26.6	4.5	53
16	10	19	1.3	2.2	7	14.1	26.5	2.7	46
17	12	28	1.2	2.1	72	13.6	26.2	3.1	46
18	13	28	1.2	1.9	160	14.2	27.5	2.2	45
19	14	28	1.3	2.0	122	15.5	28.2	7.1	43
20	17	144	2.5	4.9	184	13.5	22.9	5.7	56
21	2	10	2.3	4.1	222	10.0	13.7	6.6	68
22	1	13	2.2	5.7	232	7.7	14.6	1.4	63
23	3	15	1.8	3.5	219	6.6	15.3	1.4	53
24	3	12	1.8	5.3	188	10.6	23.1	-2.4	46
25	7	22	1.5	4.7	271	10.7	22.8	3.6	51
26	12	28	1.1	1.8	128	9.7	22.2	0.2	61
27	7	19	2.1	4.8	249	12.1	24.5	1.8	43
28	9	21	1.2	2.2	39	9.3	20.9	0.5	55
29	11	26	1.1	1.7	153	10.4	23.5	0.2	47
30	11	18	1.3	1.9	127	12.9	26.8	3.6	45

(a) Values are at Local temperature and pressure (LTP)
(b) Calculations are weighted with corresponding wind speeds

ATTACHMENT B

E-BAM PERFORMANCE CHECK / MAINTENANCE PROCEDURES AND RESULTS THIRD QUARTER 2008

1.1 Performance Check / Maintenance Procedures

1.1.1 E-BAM Sampler

Several checks are performed on the E-BAM sampler, including both its particulate monitoring system and the internal barometric pressure sensor.

1.1.1.1 Leak Check (E-BAM Manual Section 2.4.1.1)

Each month, the E-BAM sampler is checked for leaks in the sampling train that could compromise data integrity. This check is performed by installing a BX-302 valve/filter assembly in place of the sampling inlet, and running the sampler in its "pump test" mode while slowly closing the valve. The check is considered satisfactory if the flow drops to below 1.5 LPM.

1.1.1.2 Operating Flow Rate Check (E-BAM Manual Section 2.4.1.5)

The operating flow rate check is performed monthly by installing an NIST-traceable BGI Delta-Cal flow monitor in place of the sampling inlet, and comparing the indicated flow against the target of 16.7 LPM. The check is considered satisfactory if the indicated flow is within +/- 2% of the target value. Otherwise, the flow is adjusted at set points of 14.0 LPM and 17.5 LPM, and the operating flow re-checked.

A successful operating flow rate check, when preceded by a successful leak check, proves that the E-BAM sampler is collecting valid PM_{10} data.

1.1.1.3 Pump Test (E-BAM Manual Section 2.4.1.7)

The pump test is performed monthly to verify the robustness of the pump; poor results indicate that the pump is nearing the end of its life. The BX-302 valve/filter assembly is installed in place of the sampling inlet, and – with the sampler running in the "pump test" mode – partially closed to obtain an indicated flow rate between 14 and 15 LPM. The pump condition pressure reading displayed by the E-BAM then is compared against the appropriate value listed in Figure 34 of the E-BAM manual, providing an evaluation of the pump's condition.

1.1.1.4 Zero/Span Check (E-BAM Manual Section 2.4.3.1)

Zero and span membrane plates supplied with each sampler are used quarterly to check the calibration of the E-BAM sampler's beta attenuation detector (The manual indicates this check is not required until after 6 months of operation). These plates simulate specific particulate loads when used in conjunction with a blank filter tape. The checks are performed within the E-BAM sampler's "membrane test" menu, which directs the user to install and remove the plates at specified times. At the conclusion of the test, the display screen indicates whether the calibration test was successful. The membrane plates are certified by the manufacturer.

1.1.1.5 Clean Valve and Nozzle (E-BAM Manual Section 2.4.5)

The sampler's sample inlet nozzle (located directly above the filter tape) and vane (located directly beneath the filter tape) are cleaned monthly with a modified Q-tip using isopropyl alcohol. Care is taken that no excess alcohol drips into the vane assembly, which could affect the unit's calibration. Immediately after performing this maintenance, the leak check described in Section 1.1.1.1 is repeated to ensure that the sample train integrity was not compromised.

1.1.1.6 Clean PM_{10} Inlet (E-BAM Manual Appendix H)

Each month the PM_{10} inlet is removed from the sampler, disassembled and cleaned using paper towels and isopropyl alcohol. Additionally, all o-rings are lubricated with stopcock grease as necessary.

1.1.1.7 Barometric Pressure Sensor Check (E-BAM Manual Section 2.4.1.4)

The E-BAM's internal barometer is checked monthly using a Wallace and Tiernan aneroid barometer that is routinely checked against a mercury wall barometer. If the results agree within +/- 2 mmHg, no adjustment is necessary.

1.1.2 Meteorological Sensors

1.1.2.1 Temperature (E-BAM Manual Section 2.4.1.3)

The E-BAM manual specifies a two-point calibration procedure using an ambient temperature and an ice bath. However, the manufacturer indicated that a single-point field calibration check was generally sufficient. Disassembly of the sensor for placement in an ice bath is not trivial, and is impractical as a routine field activity.

The temperature sensor is checked monthly at ambient conditions using an Assmann Psychrometer that has been certified against an NIST-traceable mercury thermometer. If the readings agree to within 0.5 degrees Celsius, no adjustment is necessary.

1.1.2.2 Relative Humidity (Model 593 Relative Humidity Sensor Operation Manual)

The Model 593 Manual indicates that recalibration (requiring additional specialized equipment) is required only if the sensor element is replaced in the field. For this project, calibration of the relative humidity sensor will be limited to monthly collocated checks using an Assmann Psychrometer that is certified against an NIST-traceable mercury thermometer. Wet-bulb and dry-bulb temperatures, together with ambient barometric pressure, are used with psychrometric tables to calculate a true relative humidity, which is compared against the E-BAM display. If the indicated relative humidity agrees with that obtained by the Assmann psychrometer to within +/- 5% relative humidity, the results are considered acceptable. If consistently unacceptable results are obtained, the relative humidity sensor will be returned to the manufacturer for re-calibration and/or repair.

1.1.2.3 Wind Speed (Model 034B Wind Sensor Operation Manual)

The Model 034B Manual recommends an initial check of the unit's response to a known rotation rate. This is being done monthly in the field using a 300 rpm synchronous motor to produce a known wind speed of 18.49 mph (8.27 m/s). The manual specifies an accuracy of +/- 0.25 mph (0.11 m/s) at speeds below 22.7 mph (10.1 m/s). Additionally, the response of the sensor when stopped is observed; it should be 0.3 +/- 0.1 m/s.

1.1.2.4 Wind Direction (Model 034B Wind Sensor Operation Manual)

The manual does not specify routine checks for the wind direction sensor, beyond an initial check to confirm that the sensor's readout increases from 0 to 360 degrees as the shaft is turned clockwise. However, routine checks are performed monthly to verify proper operation. First, the sensor's alignment is verified by locking the sensor in place with its alignment pin, and ensuring that a response of between 178 and 182 degrees is obtained. Next, the sensor's linearity is verified by turning it in 90-degree intervals (using the sensor crossarm as a visual reference), and confirming that the E-BAM display's direction indication changes by 90 +/- 3 degrees with each step.

The initial orientation of the sensor was performed using a solar sighting in conjunction with NIST time (WWV) to establish precise direction azimuths. The use of solar sightings – rather than magnetic compass readings – negates any localized magnetic influences.

1.1.2.5 Filter Temperature and Humidity (E-BAM Manual Sections 2.4.2.1 and 2.4.2.2)

The E-BAM Manual includes provisions for adjusting the response of both of these parameters. However, there is no practical way to accurately check either parameter with an external reference standard. Therefore, checks of these parameters will be limited to review of downloaded data files for suspicious behavior.

1.2 Performance Check Results

Each set of performance check results is presented in Appendix A. Results obtained during the third quarter of 2008 were satisfactory with the following exceptions:

- A significant adjustment to the temperature sensor calibration was made at Warm Springs on August 21.

APPENDIX A

PERFORMANCE CHECK RESULTS

OPPORTUNITY SITE

	DATE	7/25/2008	8/12/2008	8/21/2008
	INITIALS	SH	SH	SH
	EBAM OFF-LINE@	1305 MST	N/A	N/A
	EBAM BACK ON-LINE@	1335 MST	1445 MST	N/A
		Monthly Check	(2)	Monthly Check
METEOROLOGICAL PARAMETERS				
Ambient Temperature (+/- 1 deg C)	EBAM-Indicated	28.4 (1)		12.7
	Audit	27.5		12.8
Ambient RH Check (+/- 5% RH)	EBAM-Indicated	25%		84%
	Audit (Td/Tw)	27.5 / 14.4		12.8 / 11.6
	Audit RH	25.0%		88.0%
Wind Speed Response (0.2-0.4 m/s stopped)	EBAM-Stopped	0.3		
	EBAM-Spinning	1.3		
Wind Speed - motor (+/- 0.1 m/s)	EBAM-Indicated	8.3		
	Known	8.27		
Ambient BP Check (+/- 2 mm Hg)	EBAM-Indicated	636.8		
	Audit	637		
Wind Direction Orientation (178 - 182 deg)	EBAM-Indicated (with pin locked)	179		
Wind Direction Linearity (referenced to crossarm) (+/- 3 deg. linearity)	Along crossarm	155		
	+90 degrees	243		
	+180 degrees	336		
	+270 degrees	66		
	+360 degrees	156		
EBAM SAMPLER				
Leak Check (see 2.4.1.1) (Allowed <1.5 LPM)	Result	0.8 LPM	0.8 LPM	
	Leak repaired?	N/A	N/A	
Operating Flow (see 2.4.1.5) (Target 16.7 LPM, allowed range 16.37-17.03)	As found	16.93 LPM	16.85 LPM	
	As left (if recalibrated)	N/A	N/A	
Flow Calibration - Low Flow (if necessary)	As found	N/A	N/A	
	As left	N/A	N/A	
Flow Calibration - High Flow (if necessary)	As found	N/A	N/A	
	As left	N/A	N/A	
Pump Test (see 2.4.1.7)	Pressure mm Hg	372 @ 14.8 LPM		
Clean Nozzle (see 2.4.5)	Confirm (X)	X		
Clean PM-10 Inlet (Appdx H)	Confirm (X)	N/A		
Zero/Span Verification (Quarterly - see 2.4.3.1)	Zero Pass/Fail	Pass (0.339)		
	Span Pass/Fail	Pass (0.943)		
Confirm Leak Check (after maintenance)	Result	0.8 LPM		
	Leak repaired?	N/A		

Audit and Calibration Standards	***Wind Speed:***	300 RPM synchronous motor
	Temp / RH:	Assmann Psychrometer, Dry S/N 6782, Wet S/N 709085
	Bar. Pressure:	W & T Model FA185260, S/N LL03297; Delta Cal S/N 498
	Wind Direction:	Initially oriented using solar sighting
	EBAM Flows etc.:	BGI Delta Cal, S/N 498

(1) Sunny, hot and calm so didn't adjust temperature

(2) Flow check at initial startup

OPPORTUNITY SITE

	DATE	8/25/2008	8/25/2008	9/23/2008
	INITIALS	SH	SH	SH
	EBAM OFF-LINE@	1210 MST		1450 MST
	EBAM BACK ON-LINE@		1322 MST	1520 MST
		Monthly checks	After pump change	Monthly checks
METEOROLOGICAL PARAMETERS				
Ambient Temperature (+/- 1 deg C)	EBAM-Indicated			13.4
	Audit			13.4
Ambient RH Check (+/- 5% RH)	EBAM-Indicated			26%
	Audit (Td/Tw)			13.4 / 4.9
	Audit RH			24.3%
Wind Speed Response (0.2-0.4 m/s stopped)	EBAM-Stopped	0.3		0.3
	EBAM-Spinning	3.6		2.0
Wind Speed - motor (+/- 0.1 m/s)	EBAM-Indicated	8.3		
	Known	8.27		
Ambient BP Check (+/- 2 mm Hg)	EBAM-Indicated	630.8		638.7
	Audit	631		638
Wind Direction Orientation (178 - 182 deg)	EBAM-Indicated	179		179
	(with pin locked)			
Wind Direction Linearity (referenced to crossarm) (+/- 3 deg. linearity)	Along crossarm	155		155
	+90 degrees	247		244
	+180 degrees	335		336
	+270 degrees	66		66
	+360 degrees	156		155
EBAM SAMPLER				
Leak Check (see 2.4.1.1) (Allowed <1.5 LPM)	Result	0.8 LPM		0.8 LPM
	Leak repaired?	N/A		N/A
Operating Flow (see 2.4.1.5) (Target 16.7 LPM, allowed range 16.37-17.03)	As found	16.83 LPM	16.85 LPM	16.82 LPM
	As left	N/A	N/A	N/A
	(if recalibrated)			
Flow Calibration - Low Flow (if necessary)	As found	N/A	N/A	N/A
	As left	N/A	N/A	N/A
Flow Calibration - High Flow (if necessary)	As found	N/A	N/A	N/A
	As left	N/A	N/A	N/A
Pump Test (see 2.4.1.7)	Pressure mm Hg	351 @ 14.5 LPM		366 @ 14.8 LPM
Clean Nozzle (see 2.4.5)	Confirm (X)	X		X
Clean PM-10 Inlet (Appdx H)	Confirm (X)	N/A		N/A
Zero/Span Verification (Quarterly - see 2.4.3.1)	Zero Pass/Fail	N/A		N/A
	Span Pass/Fail	N/A		N/A
Confirm Leak Check (after maintenance)	Result		0.8 LPM	0.8 LPM
	Leak repaired?		N/A	N/A

Audit and Calibration Standards	***Wind Speed:***	300 RPM synchronous motor
	Temp / RH:	Assmann Psychrometer, Dry S/N 6782, Wet S/N 709085
	Bar. Pressure:	W & T Model FA185260, S/N LL03297; Delta Cal S/N 498
	Wind Direction:	Initially oriented using solar sighting
	EBAM Flows etc.:	BGI Delta Cal, S/N 498

WARM SPRINGS SITE

	DATE	7/19/2008	7/19/2008	7/25/2008
	INITIALS	SH	SH	SH
	EBAM OFF-LINE@	1805 MST		1103 MST
	EBAM BACK ON-LINE@		1917 MST	1159 MST
		Before pump change	After pump change	Monthly checks
METEOROLOGICAL PARAMETERS				
Ambient Temperature (+/- 1 deg C)	EBAM-Indicated			24.1 (1)
	Audit			23.0
Ambient RH Check (+/- 5% RH)	EBAM-Indicated			39%
	Audit (Td/Tw)			23.0 / 14.0
	Audit RH			39.1%
Wind Speed Response (0.2-0.4 m/s stopped)	EBAM-Stopped			0.3
	EBAM-Spinning			1.5
Wind Speed - motor (+/- 0.1 m/s)	EBAM-Indicated			8.3
	Known			8.27
Ambient BP Check (+/- 2 mm Hg)	EBAM-Indicated			640.1
	Audit			640
Wind Direction Orientation (178 - 182 deg)	EBAM-Indicated			179
	(with pin locked)			
Wind Direction Linearity (referenced to crossarm) (+/- 3 deg. linearity)	Along crossarm			190
	+90 degrees			280
	+180 degrees			12
	+270 degrees			103
	+360 degrees			191
EBAM SAMPLER				
Leak Check (see 2.4.1.1) (Allowed <1.5 LPM)	Result	<0.5 LPM		<0.5 LPM
	Leak repaired?	N/A		N/A
Operating Flow (see 2.4.1.5) (Target 16.7 LPM, allowed range 16.37-17.03)	As found	16.69 LPM	16.64 LPM	16.61 LPM
	As left	N/A	N/A	N/A
	(if recalibrated)			
Flow Calibration - Low Flow (if necessary)	As found	N/A	N/A	N/A
	As left	N/A	N/A	N/A
Flow Calibration - High Flow (if necessary)	As found	N/A	N/A	N/A
	As left	N/A	N/A	N/A
Pump Test (see 2.4.1.7)	Pressure mm Hg			376 @ 14.8 LPM
Clean Nozzle (see 2.4.5)	Confirm (X)			X
Clean PM-10 Inlet (Appdx H)	Confirm (X)			X
Zero/Span Verification (Quarterly - see 2.4.3.1)	Zero Pass/Fail			Pass (0.350)
	Span Pass/Fail			Pass (0.982)
Confirm Leak Check (after maintenance)	Result		<0.5 LPM	<0.5 LPM
	Leak repaired?		N/A	N/A

Audit and Calibration Standards	***Wind Speed:***	300 RPM synchronous motor
	Temp / RH:	Assmann Psychrometer, Dry S/N 6782, Wet S/N 709085
	Bar. Pressure:	W & T Model FA185260, S/N LL03297; Delta Cal S/N 498
	Wind Direction:	Initially oriented using solar sighting
	EBAM Flows etc.:	BGI Delta Cal, S/N 498

(1) Sunny and calm so didn't adjust temperature

WARM SPRINGS SITE

	DATE	8/21/2008	8/25/2008	9/23/2008
	INITIALS	SH	SH	SH
	EBAM OFF-LINE@	N/A	1102 MST	1323 MST
	EBAM BACK ON-LINE@	N/A	1132 MST	1355 MST
		Monthly checks	Monthly checks	Monthly checks
METEOROLOGICAL PARAMETERS				
Ambient Temperature	EBAM-Indicated	16.2 (1)		14.0
(+/- 1 deg C)	Audit	14.4		13.5
Ambient RH Check	EBAM-Indicated	66%		25%
(+/- 5% RH)	Audit (Td/Tw)	14.4 / 11.3		13.5 / 5.2
	Audit RH	71.3%		27.3%
Wind Speed Response	EBAM-Stopped		0.3	0.3
(0.2-0.4 m/s stopped)	EBAM-Spinning		2.3	1.9
Wind Speed - motor	EBAM-Indicated		8.3	
(+/- 0.1 m/s)	Known		8.27	
Ambient BP Check	EBAM-Indicated		634.4	642.1
(+/- 2 mm Hg)	Audit		634	642
Wind Direction Orientation	EBAM-Indicated		178	179
(178 - 182 deg)	(with pin locked)			
Wind Direction Linearity	Along crossarm		190	190
(referenced to crossarm)	+90 degrees		281	281
(+/- 3 deg. linearity)	+180 degrees		9	9
	+270 degrees		102	102
	+360 degrees		191	190
EBAM SAMPLER				
Leak Check (see 2.4.1.1)	Result		<0.5 LPM	<0.5 LPM
(Allowed <1.5 LPM)	Leak repaired?		N/A	N/A
Operating Flow (see 2.4.1.5)	As found		16.73 LPM	16.75 LPM
(Target 16.7 LPM,	As left		N/A	N/A
allowed range 16.37-17.03)	(if recalibrated)			
Flow Calibration - Low Flow	As found		N/A	N/A
(if necessary)	As left		N/A	N/A
Flow Calibration - High Flow	As found		N/A	N/A
(if necessary)	As left		N/A	N/A
Pump Test (see 2.4.1.7)	Pressure mm Hg		360 @ 14.5 LPM	364 @ 14.7 LPM
Clean Nozzle (see 2.4.5)	Confirm (X)		X	X
Clean PM-10 Inlet (Appdx H)	Confirm (X)		X	X
Zero/Span Verification	Zero Pass/Fail		N/A	N/A
(Quarterly - see 2.4.3.1)	Span Pass/Fail		N/A	N/A
Confirm Leak Check	Result		<0.5 LPM	<0.5 LPM
(after maintenance)	Leak repaired?		N/A	N/A

Audit and Calibration Standards	***Wind Speed:***	300 RPM synchronous motor
	Temp / RH:	Assmann Psychrometer, Dry S/N 6782, Wet S/N 709085
	Bar. Pressure:	W & T Model FA185260, S/N LL03297; Delta Cal S/N 498
	Wind Direction:	Initially oriented using solar sighting
	EBAM Flows etc.:	BGI Delta Cal, S/N 498

(1) Adjusted temperature calibration

ATTACHMENT C

AIR QUALITY SYSTEM NULL DATA QUALIFIER CODES
THIRD QUARTER 2008

Opportunity Site July 2008 (All values are TSP in micrograms per cubic meter at Local temperature and pressure, except as noted below)

	Hour Beginning																								
DAY	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MEAN
1	**12**	**6**	**10**	**12**	**9**	**16**	**3**	**7**	**11**	**8**	**15**	BA	251	31	84	47	16	25	32	223	101	34	8	10	12	71.8
2	-4	104	28	-5	32	0	23	30	16	30	19	8	13	12	13	24	18	15	16	18	26	41	25	7	24	21.2
3	17	25	16	-5	-5	39	15	23	25	25	23	24	29	52	58	59	50	39	52	88	82	28	25	33	24	34.0
4	20	35	80	26	39	33	22	23	31	40	36	45	73	116	70	79	54	20	28	40	28	18	54	41	24	43.8
5	28	26	15	86	46	34	21	30	18	30	41	28	36	42	34	31	29	38	29	24	26	21	32	38	24	32.6
6	30	22	16	16	21	16	6	8	9	14	19	19	28	41	54	59	47	30	29	20	20	21	26	15	24	24.4
7	22	23	9	6	24	19	18	10	22	21	22	25	24	32	42	95	47	40	38	35	34	40	46	40	24	30.6
8	33	41	24	36	38	25	41	40	32	27	39	32	38	41	44	47	49	32	30	20	21	27	20	16	24	33.0
9	24	22	22	18	20	26	34	43	31	29	30	50	64	46	46	45	36	48	36	28	24	43	34	30	24	34.5
10	24	16	19	17	29	31	147	42	76	99	91	90	103	231	53	81	70	84	55	52	56	62	87	107	24	71.8
11	125	191	167	127	104	78	67	39	24	24	18	27	17	2	25	14	23	28	20	18	14	26	28	13	24	50.8
12	16	19	11	9	25	27	46	20	16	12	16	19	16	13	14	18	20	16	20	17	29	34	19	22	24	19.8
13	9	5	3	5	29	25	88	20	21	19	21	29	20	26	22	20	29	48	33	24	30	24	21	18	24	24.5
14	9	12	11	7	16	43	33	43	35	44	50	42	51	57	44	37	25	17	21	17	16	26	24	14	24	28.9
15	15	13	12	9	15	33	18	47	31	39	57	98	41	35	22	24	29	26	34	85	28	26	31	33	24	33.4
16	19	37	10	17	21	39	43	58	38	47	72	56	65	62	68	69	49	106	55	92	53	44	43	39	24	50.1
17	39	26	25	23	25	33	33	12	37	30	42	28	33	36	26	28	34	27	26	23	15	26	25	25	24	28.2
18	17	14	21	10	24	39	28	35	13	18	9	24	32	34	AV	AV	AV	AV	AV	22	20	22	8	12	19	21.2
19	15	25	7	7	8	3	7	18	16	16	13	17	27	22	22	22	15	25	16	19	15	26	12	22	24	16.5
20	17	10	13	12	12	3	15	6	37	59	46	28	34	31	37	39	26	36	23	29	36	28	23	18	24	25.8
21	15	10	10	21	7	44	34	28	38	59	43	40	34	33	30	36	33	32	33	46	41	49	52	25	24	33.0
22	30	21	27	20	29	28	36	48	67	17	8	20	17	25	28	39	-5	12	2	7	13	12	3	3	24	21.1
23	15	10	-5	67	23	27	13	72	20	21	28	25	27	27	25	35	17	35	25	24	44	29	28	29	24	27.5
24	26	36	31	30	21	37	17	12	13	12	15	16	21	20	23	20	16	20	16	17	17	17	15	14	24	20.1
25	12	12	-5	26	5	45	14	22	27	38	23	21	22	BA	28	31	30	30	22	21	21	27	23	26	23	22.7
26	20	18	21	28	26	16	27	27	19	35	34	32	57	40	29	27	34	51	32	35	39	38	33	40	24	31.6
27	44	27	18	27	26	35	24	29	36	38	20	37	58	52	36	34	29	39	39	48	43	39	32	31	24	35.0
28	25	34	34	27	24	56	34	31	26	21	38	80	46	53	55	68	43	66	35	20	24	29	22	15	24	37.8
29	8	7	11	10	13	59	37	38	26	27	30	102	78	67	112	101	83	32	38	44	91	55	23	18	24	46.3
30	19	23	22	24	29	46	49	33	51	33	47	43	29	36	46	37	36	27	24	18	4	11	12	11	24	29.6
31	17	11	5	12	10	28	19	32	36	19	36	32	46	142	57	55	48	43	33	56	31	34	19	19	24	35.0
NO.	30	30	30	30	30	30	30	30	30	30	30	30	31	30	30	30	30	30	30	31	31	31	31	31		
MAX.	125	191	167	127	104	78	147	72	76	99	91	102	251	231	112	101	83	106	55	223	101	62	87	107		
AVG.	24	29	23	24	25	32	34	31	30	31	33	38	46	49	42	44	34	36	30	40	34	31	28	25		

Values in red bold are PM-10. All other values are TSP
Calculated averages are based on TSP readings only
Note: Negative values will be addressed with development of a detection limit in the annual report.

Opportunity Site August 2008 (All values are TSP in micrograms per cubic meter at Local temperature and pressure)

	Hour Beginning																								
DAY	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MEAN
1	7	12	2	10	14	29	47	34	21	25	33	23	BA	93	76	58	85	47	42	44	32	20	19	18	23	34.4
2	18	19	14	12	14	23	18	21	24	20	22	35	26	34	40	69	20	46	34	15	19	23	16	22	24	25.2
3	18	32	1	41	-5	24	13	19	17	40	33	41	69	34	108	21	15	9	10	11	13	14	6	15	24	25.0
4	25	30	1	16	23	16	2	17	30	30	31	34	307	352	59	27	19	15	13	21	21	19	9	14	24	47.1
5	9	13	12	-5	9	29	29	28	35	46	34	50	58	36	43	42	27	30	27	24	30	19	36	24	24	28.5
6	27	19	11	7	9	67	52	42	38	22	48	60	44	56	33	37	21	34	26	35	57	35	25	18	24	34.3
7	15	27	22	10	17	36	38	18	39	27	230	177	BA	60	31	36	56	16	11	14	11	9	11	6	23	39.9
8	12	11	11	11	14	15	11	14	15	31	23	23	41	48	26	2	17	19	164	25	17	11	10	3	24	23.9
9	9	3	4	5	17	10	23	0	12	24	16	29	31	26	12	19	23	27	12	13	34	11	9	13	24	15.9
10	19	4	5	8	9	29	7	193	17	25	36	56	120	66	41	38	32	65	61	26	26	14	8	8	24	38.0
11	9	10	9	8	14	31	-1	15	19	19	24	26	34	40	49	BA	BA	BA	BA	BA	BA	BA	BA	BA	15	20.4
12	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	BA	25	18	17	19	19	34	30	14	6	9	20.2
13	9	9	8	12	16	46	36	48	42	25	51	31	22	17	14	9	14	14	15	17	19	22	7	10	24	21.4
14	10	10	9	5	12	22	14	22	16	32	30	51	48	59	44	32	31	20	28	22	20	31	29	23	24	25.8
15	17	26	18	18	44	40	21	24	28	27	19	28	37	28	25	19	20	12	18	33	42	29	13	46	24	26.3
16	14	14	2	8	10	8	24	27	37	20	18	13	20	17	23	16	18	13	16	33	43	32	19	18	24	19.3
17	8	23	20	15	14	33	51	13	22	31	28	17	16	33	23	23	36	26	27	32	23	22	20	17	24	23.9
18	17	1	22	16	11	26	24	60	46	49	50	40	25	62	58	22	49	35	32	33	49	23	27	31	24	33.7
19	26	25	41	39	61	75	82	93	159	111	71	166	204	114	87	78	71	45	41	59	34	106	29	14	24	76.3
20	31	38	10	-5	48	43	34	36	35	29	40	39	38	28	46	35	48	48	48	2	16	12	9	-5	24	29.3
21	-5	6	8	-5	27	27	7	2	14	10	33	7	2	8	12	57	45	4	5	8	27	-5	-4	1	24	12.1
22	8	-5	8	7	5	4	5	6	13	8	4	7	7	6	8	12	8	7	9	12	28	10	7	7	24	8.0
23	6	8	-2	9	8	12	4	13	8	12	13	22	14	28	24	34	27	29	28	30	10	22	30	24	24	17.2
24	23	13	15	22	8	22	20	45	24	30	24	19	12	16	35	36	34	17	15	28	4	23	11	18	24	21.4
25	9	6	17	17	18	31	50	45	24	42	56	58	BA	BA	43	46	37	32	19	24	309	178	115	58	22	56.1
26	10	13	66	-5	2	1	1	-5	10	13	7	18	18	21	22	19	13	8	1	9	6	15	12	4	24	11.6
27	-3	2	2	4	11	11	30	19	12	91	34	27	21	8	27	16	10	16	10	23	23	26	41	31	24	20.5
28	57	29	21	13	27	43	40	44	53	18	26	17	19	7	9	12	23	7	5	8	0	38	9	14	24	22.5
29	10	6	6	3	8	11	15	24	26	22	33	40	41	39	21	9	12	16	16	39	14	24	16	11	24	19.3
30	12	13	4	12	17	30	19	23	15	24	66	31	65	86	15	61	13	31	18	20	19	12	13	20	24	26.6
31	22	26	19	17	3	31	8	0	10	1	7	17	7	17	41	10	2	5	5	23	0	3	14	10	24	12.4
NO.	30	30	30	30	30	30	30	30	30	30	30	30	27	29	30	30	30	30	30	30	30	30	30	30		
MAX.	57	38	66	41	61	75	82	193	159	111	230	177	307	352	108	78	85	65	164	59	309	178	115	58		
AVG.	15	15	13	11	16	28	24	31	29	30	38	40	50	50	37	31	28	24	26	23	33	28	19	17		

Note: Negative values will be addressed with development of a detection limit in the annual report.

Opportunity Site September 2008 (All values are TSP in micrograms per cubic meter at Local temperature and pressure)

	Hour Beginning																								
DAY	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MEAN
1	16	6	20	5	16	17	AV	AV	AV	AV	AV	16	18	-5	1	BA	2	-4	6	10	5	1	6	8	18	8.0
2	6	2	8	15	10	4	16	0	-3	15	14	9	6	2	2	10	3	3	10	11	8	11	6	7	24	7.3
3	8	7	-1	5	5	9	5	2	8	13	26	10	-3	29	14	18	21	15	12	19	5	13	6	9	24	10.6
4	13	7	6	9	3	13	12	3	14	23	25	10	11	12	5	2	2	17	58	7	4	10	7	11	24	11.8
5	2	14	5	6	-4	6	9	2	29	3	11	7	11	9	40	6	13	6	7	17	6	7	4	5	24	9.2
6	10	12	14	15	11	13	14	8	-3	-1	14	6	7	20	7	12	9	13	19	17	10	9	4	11	24	10.5
7	6	2	19	7	7	5	-2	8	2	-5	18	-3	2	7	1	10	-2	9	15	7	5	9	16	14	24	6.5
8	1	10	6	10	9	8	6	-1	6	12	9	6	10	-3	9	12	10	8	19	7	18	7	10	13	24	8.4
9	5	6	9	4	12	9	10	6	17	21	19	24	12	16	17	31	28	27	17	21	13	18	13	18	24	15.5
10	7	19	15	12	19	22	8	1	20	-5	35	4	-5	2	-1	7	-4	-3	8	5	5	13	-5	20	24	8.3
11	11	15	-3	19	-3	4	20	-3	13	-2	13	8	4	7	1	5	6	15	16	30	15	4	11	7	24	8.9
12	0	3	7	1	2	13	4	10	2	56	4	17	11	12	14	8	18	8	63	16	19	15	11	13	24	13.6
13	7	9	8	2	15	-1	20	0	16	21	8	4	23	25	92	24	16	23	21	34	17	27	19	20	24	18.8
14	7	10	6	2	9	12	-1	10	8	12	19	12	25	16	15	48	16	17	23	14	18	4	12	13	24	13.6
15	9	11	4	0	8	22	6	35	23	40	33	27	19	25	17	30	43	12	28	23	15	16	15	11	24	19.7
16	9	8	9	10	6	12	14	10	19	76	35	28	27	32	38	20	21	20	32	25	26	22	28	19	24	22.8
17	13	19	17	5	22	25	39	38	39	23	24	35	29	30	36	33	22	10	35	31	15	22	6	18	24	24.4
18	20	9	14	11	10	28	32	33	29	25	21	26	37	41	40	29	20	21	44	31	29	16	13	10	24	24.5
19	25	12	15	7	16	19	17	28	38	71	66	39	34	50	40	14	25	31	31	27	31	19	22	11	24	28.7
20	19	16	11	10	22	26	8	11	32	91	117	32	18	27	6	17	543	53	8	4	3	-2	-1	4	24	44.8
21	4	9	-1	2	7	1	6	3	-1	1	13	0	1	-1	15	9	6	4	4	6	12	7	7	1	24	4.8
22	7	10	-3	3	5	11	9	8	18	2	6	11	1	2	5	12	5	37	19	13	4	2	2	-2	24	7.8
23	4	4	-4	11	8	11	17	7	18	12	9	3	5	11	10	BA	6	12	-1	10	14	10	7	9	23	8.4
24	-2	3	1	6	8	7	8	19	38	9	27	25	15	16	15	26	12	17	8	4	15	8	6	15	24	12.8
25	5	10	11	8	9	12	22	23	25	17	24	27	35	30	30	19	25	20	29	25	20	18	20	16	24	20.0
26	14	15	13	21	-4	18	38	15	23	31	21	25	21	16	15	19	22	20	28	29	18	8	13	6	24	18.5
27	16	14	3	10	1	4	9	8	11	16	14	7	19	16	27	14	23	12	13	13	20	17	20	15	24	13.4
28	19	14	13	14	13	11	12	10	8	22	13	17	14	13	21	12	16	16	13	23	13	34	12	22	24	15.6
29	17	9	12	18	26	14	39	16	16	13	29	50	38	36	24	28	18	37	33	21	15	15	10	13	24	22.8
30	10	-5	7	7	8	14	11	26	49	46	40	80	409	122	37	39	21	24	49	21	17	15	8	7	24	44.3
NO.	30	30	30	30	30	30	29	29	29	29	29	30	30	30	30	28	30	30	30	30	30	30	30	30		
MAX.	25	19	20	21	26	28	39	38	49	91	117	80	409	122	92	48	543	53	63	34	31	34	28	22		
AVG.	10	9	8	9	9	12	14	12	18	23	24	19	28	21	20	18	32	17	22	17	14	13	10	11		

Note: Negative values will be addressed with development of a detection limit in the annual report.

Warm Springs Site July 2008 (All values are PM-10 in micrograms per cubic meter at Local temperature and pressure

	Hour Beginning																								
DAY	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MEAN
1	0	6	2	15	5	8	10	24	11	11	BA	14	35	-5	15	8	4	7	7	6	1	8	10	19	23	9.6
2	13	81	4	9	-1	14	34	0	6	8	20	2	4	14	12	7	11	9	10	14	13	14	12	6	24	13.2
3	5	16	3	21	2	35	-2	18	12	16	12	15	17	9	18	18	10	15	24	26	12	87	15	21	24	17.7
4	13	11	8	14	9	10	15	17	17	11	10	9	11	19	2	30	16	17	16	34	0	42	14	36	24	15.9
5	-4	1	12	45	31	22	41	30	15	33	26	22	19	23	17	20	13	10	7	8	8	10	10	17	24	18.2
6	13	20	10	16	-3	24	7	19	-3	2	15	9	9	0	16	11	11	-1	16	9	-1	2	5	9	24	9.0
7	5	6	6	16	-5	9	2	6	17	8	8	11	16	10	4	16	18	13	17	17	15	8	18	32	24	11.4
8	26	16	20	28	21	28	13	28	22	15	21	11	10	15	12	5	13	11	15	15	10	10	5	16	24	16.1
9	15	11	5	9	4	14	9	24	14	13	18	11	12	12	10	8	12	15	34	20	-3	8	9	10	24	12.3
10	3	14	7	6	5	5	26	22	16	18	15	14	12	14	12	23	19	17	12	12	9	27	17	20	24	14.4
11	45	41	36	37	24	18	17	22	22	12	19	7	11	0	14	-1	7	8	7	6	2	7	14	6	24	15.9
12	1	4	2	2	0	7	3	17	8	10	16	3	5	8	4	3	3	8	4	9	-5	8	10	6	24	5.7
13	3	3	8	10	4	7	2	13	19	11	10	7	4	7	7	1	-1	11	9	2	2	11	9	6	24	6.9
14	10	9	3	9	4	7	8	20	15	13	17	12	17	12	7	4	10	1	7	1	4	-5	15	6	24	8.6
15	-5	8	-2	3	10	7	18	21	20	16	23	18	13	16	12	16	9	15	19	19	22	19	16	16	24	13.7
16	14	11	8	17	9	11	22	11	29	18	35	37	28	29	34	30	28	30	44	30	21	23	33	17	24	23.7
17	21	27	20	23	20	22	14	16	21	14	12	14	8	11	10	14	20	18	11	6	2	28	12	19	24	16.0
18	5	6	7	13	11	1	2	22	11	19	5	15	-4	19	15	-5	14	17	11	1	-1	6	2	12	24	8.5
19	3	3	5	9	6	7	0	14	11	4	10	6	4	7	-5	5	5	8	BA	BA	1	10	9	9	22	6.0
20	9	4	1	6	6	13	12	12	12	11	24	4	29	9	18	-4	65	11	7	11	2	21	19	10	24	13.0
21	15	8	6	25	16	14	17	25	22	19	19	15	17	16	10	12	10	19	25	16	20	19	13	15	24	16.4
22	10	15	10	12	22	14	19	23	34	18	16	15	27	17	9	15	-5	12	-2	9	3	7	7	8	24	13.1
23	9	20	16	179	78	18	24	-3	16	26	17	14	17	15	11	12	15	20	8	16	13	26	22	24	24	25.5
24	26	24	25	25	19	2	20	23	16	13	15	12	15	10	15	12	8	8	4	8	-2	4	15	15	24	13.8
25	10	23	1	18	11	6	1	21	13	14	9	BA	31	5	10	10	18	10	21	15	13	13	6	22	23	13.1
26	10	13	10	14	17	19	19	24	26	18	22	22	19	7	13	14	15	12	26	18	19	24	22	25	24	17.8
27	21	16	22	25	18	13	18	35	33	20	25	26	21	19	21	23	28	19	24	31	22	28	34	22	24	23.5
28	18	9	23	28	28	28	17	33	22	21	21	19	14	14	21	9	12	11	4	7	11	-2	1	9	24	15.8
29	13	9	5	7	10	4	18	27	21	7	22	15	27	19	15	22	17	46	-5	10	2	7	16	1	24	14.0
30	16	9	17	14	25	19	-3	28	25	14	20	17	9	13	35	15	8	5	-1	1	-2	0	0	11	24	12.3
31	0	3	2	3	7	3	-4	15	12	14	15	26	3	-1	2	3	5	8	4	9	-2	12	6	10	24	6.5
NO.	31	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	30	30	31	31	31	31		
MAX.	45	81	36	179	78	35	41	35	34	33	35	37	35	29	35	30	65	46	44	34	22	87	34	36		
AVG.	11	14	10	21	13	13	13	20	17	14	17	14	15	12	13	11	13	13	13	13	7	16	13	15		

Note: Negative values will be addressed with development of a detection limit in the annual report.

Warm Springs Site August 2008 (All values are PM-10 in micrograms per cubic meter at Local temperature and pressure

	Hour Beginning																									
DAY	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MEAN
1	7	3	17	7	7	9	3	21	21	21	21	BA	22	17	13	22	22	18	29	19	12	15	17	-5	23	14.7
2	13	4	10	12	22	14	17	9	22	13	13	11	13	16	12	23	-2	25	13	18	8	-5	26	-5	24	12.6
3	38	7	2	13	20	23	11	15	16	18	18	20	20	20	13	6	10	11	-5	-4	4	3	8	11	24	12.4
4	7	12	11	2	10	-5	15	8	23	13	9	8	8	15	8	6	8	11	6	10	-5	4	8	3	24	8.1
5	11	-2	7	2	5	9	8	17	21	13	17	12	15	18	8	7	11	6	12	6	13	4	18	3	24	10.0
6	15	3	10	4	10	7	13	29	13	16	10	18	8	13	1	12	4	27	12	13	19	38	11	20	24	13.6
7	15	6	12	4	7	14	13	15	8	13	17	6	AV	AV	15	15	15	-5	18	6	-5	9	9	10	22	9.9
8	11	15	6	10	8	7	8	19	11	16	18	16	8	21	6	10	10	7	-2	-5	-3	10	4	5	24	9.0
9	3	11	6	10	9	-5	15	14	16	7	14	13	15	-2	1	18	1	4	-2	4	0	18	0	4	24	7.3
10	-5	4	18	5	1	15	4	4	5	21	14	12	27	12	24	8	11	20	11	5	1	2	2	4	24	9.4
11	7	6	4	11	7	15	12	3	10	8	11	11	12	3	8	5	2	4	7	-2	-5	7	5	7	24	6.6
12	2	-1	2	4	4	4	1	24	13	17	9	6	9	12	8	7	2	5	3	1	1	5	10	3	24	6.3
13	14	0	7	15	8	10	9	9	23	4	11	1	11	7	-4	8	12	11	3	9	3	3	19	-5	24	7.8
14	6	11	8	8	12	9	-1	15	14	13	17	8	13	14	14	7	12	10	10	9	11	16	18	9	24	11.0
15	20	18	13	14	5	9	1	20	17	16	13	10	8	15	11	10	3	5	7	-2	8	9	8	4	24	10.1
16	4	7	4	3	6	4	6	17	15	5	13	15	4	8	9	10	4	2	8	1	16	16	14	11	24	8.4
17	11	4	6	12	10	13	6	15	17	13	11	7	6	6	11	9	5	-2	8	7	9	13	17	-2	24	8.8
18	18	4	4	8	8	8	10	24	29	19	14	12	3	11	8	8	-5	12	10	8	-3	5	20	19	24	10.6
19	12	17	23	13	25	37	27	39	65	61	59	39	21	52	53	53	51	48	41	41	27	20	9	19	24	35.5
20	18	21	29	18	33	2	37	13	24	16	8	20	15	7	17	10	8	0	-4	6	7	-2	7	13	24	13.5
21	10	8	-5	-3	3	-4	-1	10	11	-5	7	-2	-5	12	-2	-5	1	-5	-4	-2	-1	3	-1	-5	24	0.6
22	-1	0	3	-1	5	5	0	6	10	11	9	8	8	10	5	6	6	3	1	4	-5	-5	14	3	24	4.4
23	4	6	-1	-5	15	10	-1	1	7	16	14	7	14	4	18	23	17	15	16	12	4	18	17	21	24	10.5
24	14	8	18	16	15	17	14	25	24	30	22	16	4	5	5	4	6	-5	15	1	7	5	14	6	24	11.9
25	8	10	7	11	22	16	-1	23	10	14	10	BA	20	22	19	12	17	13	7	10	35	2	8	9	23	13.2
26	0	6	9	0	5	0	-5	2	-2	4	16	10	13	9	4	10	-3	-1	-2	1	-5	2	8	5	24	3.6
27	3	0	8	-3	7	1	4	5	0	13	5	11	5	-2	5	0	1	-5	5	1	8	11	6	15	24	4.3
28	8	13	-2	10	8	3	6	10	16	12	14	4	6	1	0	7	8	2	-5	-4	3	0	3	0	24	5.1
29	0	9	-5	4	-2	1	-3	3	11	13	7	2	1	-1	-1	6	-5	-5	25	-1	-5	4	12	3	24	3.0
30	0	2	-4	7	14	11	11	-2	13	12	15	10	13	3	17	4	13	15	-2	11	9	10	-1	8	24	7.9
31	8	5	8	12	-5	23	-5	16	9	6	-1	-1	8	5	7	4	2	7	-3	-5	0	-2	4	0	24	4.3
NO.	31	31	31	31	31	31	31	31	31	31	31	29	30	30	31	31	31	31	31	31	31	31	31	31		
MAX.	38	21	29	18	33	37	37	39	65	61	59	39	27	52	53	53	51	48	41	41	35	38	26	21		
AVG.	9	7	8	7	10	9	8	14	16	14	14	11	11	11	10	10	8	8	8	6	5	8	10	6		

Note: Negative values will be addressed with development of a detection limit in the annual report.

Warm Springs Site September 2008 (All values are PM-10 in micrograms per cubic meter at Local temperature and pressure

	Hour Beginning																								
DAY	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MEAN
1	-5	-5	-5	-5	11	-3	0	-1	1	-5	9	6	-5	-3	BA	1	1	0	-4	-4	3	25	6	9	23	1.2
2	-5	5	2	-5	10	6	-1	-2	4	6	16	13	118	9	10	0	27	2	-3	-4	11	-4	4	5	24	9.3
3	1	5	6	3	7	2	4	2	3	8	7	15	-3	15	6	9	8	-1	-2	-4	-4	4	8	4	24	4.3
4	9	6	6	8	-1	3	9	4	5	14	-5	9	-5	5	-1	6	11	-5	5	10	17	-5	13	38	24	6.5
5	10	20	6	3	4	9	1	-2	5	8	17	9	10	-1	5	9	-3	3	0	7	6	3	1	10	24	5.8
6	0	8	2	5	4	50	28	9	2	-5	14	3	17	9	4	0	0	8	-5	7	1	11	5	11	24	7.8
7	11	-5	18	7	18	5	3	11	-3	7	0	8	0	3	8	11	-1	6	3	-1	8	6	21	0	24	6.0
8	6	6	-3	12	12	6	0	-3	8	16	12	6	5	6	8	-1	5	-2	1	-5	5	2	7	8	24	4.9
9	7	4	6	7	16	4	1	0	3	16	13	16	8	10	15	9	0	14	12	12	5	12	12	8	24	8.8
10	7	24	-5	24	13	2	14	7	9	0	1	2	1	11	9	7	-5	-5	3	0	0	-5	-5	1	24	4.6
11	0	10	3	-1	9	4	-5	3	1	1	11	12	0	5	12	-3	-3	-5	4	-4	6	3	6	8	24	3.2
12	-2	10	0	-2	-5	11	-5	-3	7	10	16	11	6	9	5	5	4	6	1	-5	-1	6	5	9	24	4.1
13	11	3	8	3	-5	25	11	-2	-2	-1	3	1	11	7	6	4	2	3	8	-4	3	10	1	12	24	4.9
14	16	4	16	8	12	20	-5	-1	5	14	12	10	9	3	5	9	3	-3	3	-5	1	11	8	8	24	6.8
15	0	3	4	4	9	6	4	3	10	19	14	13	5	9	11	6	12	3	7	-5	5	2	-2	8	24	6.3
16	9	3	8	6	6	18	-1	-2	16	17	18	10	6	12	14	19	9	8	6	4	7	15	17	8	24	9.7
17	11	16	12	12	21	11	15	6	17	28	24	19	19	21	12	6	9	7	2	-5	4	9	5	15	24	12.3
18	10	6	6	13	8	20	11	11	28	26	24	19	15	15	15	4	7	14	-5	13	14	7	15	17	24	13.0
19	14	9	13	14	17	14	12	11	26	26	11	14	16	28	16	3	12	18	-2	11	14	4	19	9	24	13.7
20	18	11	16	12	25	18	10	12	13	25	26	38	14	11	-4	14	144	16	5	-2	-5	0	-1	2	24	17.4
21	7	1	-4	2	1	0	3	3	0	-3	-5	-5	-2	2	5	10	3	5	2	7	3	5	8	-2	24	1.9
22	1	3	-5	6	-1	-1	7	-5	5	2	-3	-5	0	9	-4	2	-3	8	-5	13	5	-1	9	-5	24	1.3
23	9	2	-1	6	7	-2	1	7	1	15	4	7	6	BA	BA	-1	6	1	-5	-3	9	5	2	0	22	3.5
24	4	0	3	-2	6	2	-3	-5	8	9	11	2	6	12	9	8	5	7	1	-4	2	5	-2	-2	24	3.4
25	10	7	-5	11	-2	1	18	0	12	12	11	22	6	19	7	2	7	2	5	-1	1	11	6	14	24	7.3
26	9	11	16	19	-1	1	24	11	20	28	10	20	18	13	11	2	1	13	6	6	13	16	10	8	24	11.9
27	7	5	14	5	-5	9	5	10	10	11	11	4	5	14	1	7	1	-3	7	1	11	8	10	19	24	7.0
28	14	8	12	15	-3	-2	12	-3	12	21	17	12	15	15	3	13	6	6	2	-5	16	5	13	6	24	8.8
29	16	13	17	22	4	8	16	6	14	26	26	12	9	12	5	15	1	15	-5	-5	8	1	6	11	24	10.5
30	3	12	13	10	11	12	10	13	14	18	16	14	18	14	16	18	4	11	-5	-1	2	13	4	12	24	10.5
NO.	30	30	30	30	30	30	30	30	30	30	30	30	30	29	28	30	30	30	30	30	30	30	30	30		
MAX.	18	24	18	24	25	50	28	13	28	28	26	38	118	28	16	19	144	18	12	13	17	25	21	38		
AVG.	7	7	6	7	7	9	7	3	8	12	11	11	11	10	7	6	9	5	1	1	6	6	7	8		

Note: Negative values will be addressed with development of a detection limit in the annual report.

Qualifier Codes and Descriptions

as of 12-APR-07

Qualifier Type	Qualifier Type Desc	Qualifier Code	Qualifier Desc
EX	Exceptional Event Qualifier	D	SANDBLASTING
		F	STRUCTURAL FIRE
		H	CHEMICAL SPILLS & INDUST. ACCIDENTS
		I	UNUSUAL TRAFFIC CONGESTION
		J	CONSTRUCTION/DEMOLITION
		K	AGRICULTURAL TILLING
		L	HIGHWAY CONSTRUCTION
		M	REROUTING OF TRAFFIC
		N	SANDING/SALTING OF STREETS
		O	INFREQUENT LARGE GATHERINGS
		P	ROOFING OPERATIONS
		Q	PRESCRIBED BURNING
		R	CLEAN UP AFTER A MAJOR DISASTER
NAT	Natural Event Qualifier	A	HIGH WINDS
		B	STRATOSPHERIC OZONE INTRUSION
		C	VOLCANIC ERUPTIONS
		E	FOREST FIRE
		G	HIGH POLLEN COUNT
		S	SEISMIC ACTIVITY
		U	SAHARA DUST
NULL	Null Data Qualifier	AA	SAMPLE PRESSURE OUT OF LIMITS
		AB	TECHNICIAN UNAVAILABLE
		AC	CONSTRUCTION/REPAIRS IN AREA
		AD	SHELTER STORM DAMAGE
		AE	SHELTER TEMPERATURE OUTSIDE LIMITS
		AF	SCHEDULED BUT NOT COLLECTED
		AG	SAMPLE TIME OUT OF LIMITS
		AH	SAMPLE FLOW RATE OUT OF LIMITS
		AI	INSUFFICIENT DATA (CANNOT CALCULATE)
		AJ	FILTER DAMAGE
		AK	FILTER LEAK
		AL	VOIDED BY OPERATOR
		AM	MISCELLANEOUS VOID
		AN	MACHINE MALFUNCTION
		AO	BAD WEATHER
		AP	VANDALISM
		AQ	COLLECTION ERROR
		AR	LAB ERROR
		AS	POOR QUALITY ASSURANCE RESULTS
		AT	CALIBRATION
		AU	MONITORING WAIVED
		AV	POWER FAILURE (POWR)
		AW	WILDLIFE DAMAGE
		AX	PRECISION CHECK (PREC)
		AY	Q C CONTROL POINTS (ZERO/SPAN)
		AZ	Q C AUDIT (AUDT)

		BA	MAINTENANCE/ROUTINE REPAIRS
		BB	UNABLE TO REACH SITE
		BC	MULTI-POINT CALIBRATION
		BD	AUTO CALIBRATION
		BE	BUILDING/SITE REPAIR
		BF	PRECISION/ZERO/SPAN
		BG	Missing ozone data not likely to exceed level of standard
		BH	Interference/co-elution
		BI	Lost or damaged in transit
		BJ	Operator Error
		BK	Site computer/data logger down
		SA	Storm Approaching
QA	Quality Assurance Qualifier	1	Deviation from a CFR/Critical Criteria Requirement
		2	Operational Deviation
		3	Field Issue
		4	Lab Issue
		5	Outlier
		6	QAPP Issue
		7	Below Lowest Calibration Level
		9	Negative value detected - zero reported
		MD	Value between MDL and IDL
		ND	No Value Detected
		SQ	Values Between SQL and MDL
		V	VALIDATED VALUE
		W	FLOW RATE AVERAGE OUT OF SPEC.
		X	FILTER TEMPERATURE DIFFERENCE OUT OF SPEC.
		Y	ELAPSED SAMPLE TIME OUT OF SPEC.